WIRE AND WIRE PRODUCTS

APRIL 1952

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in continuous
wire drawing—

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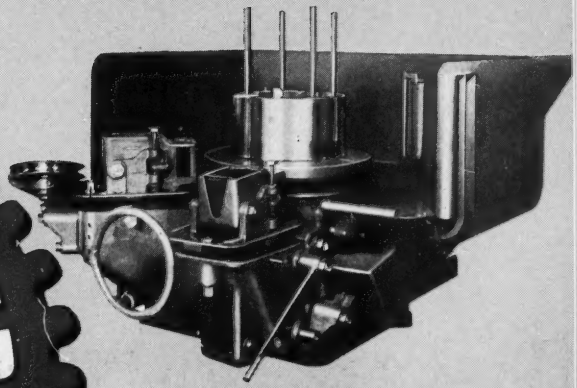
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COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

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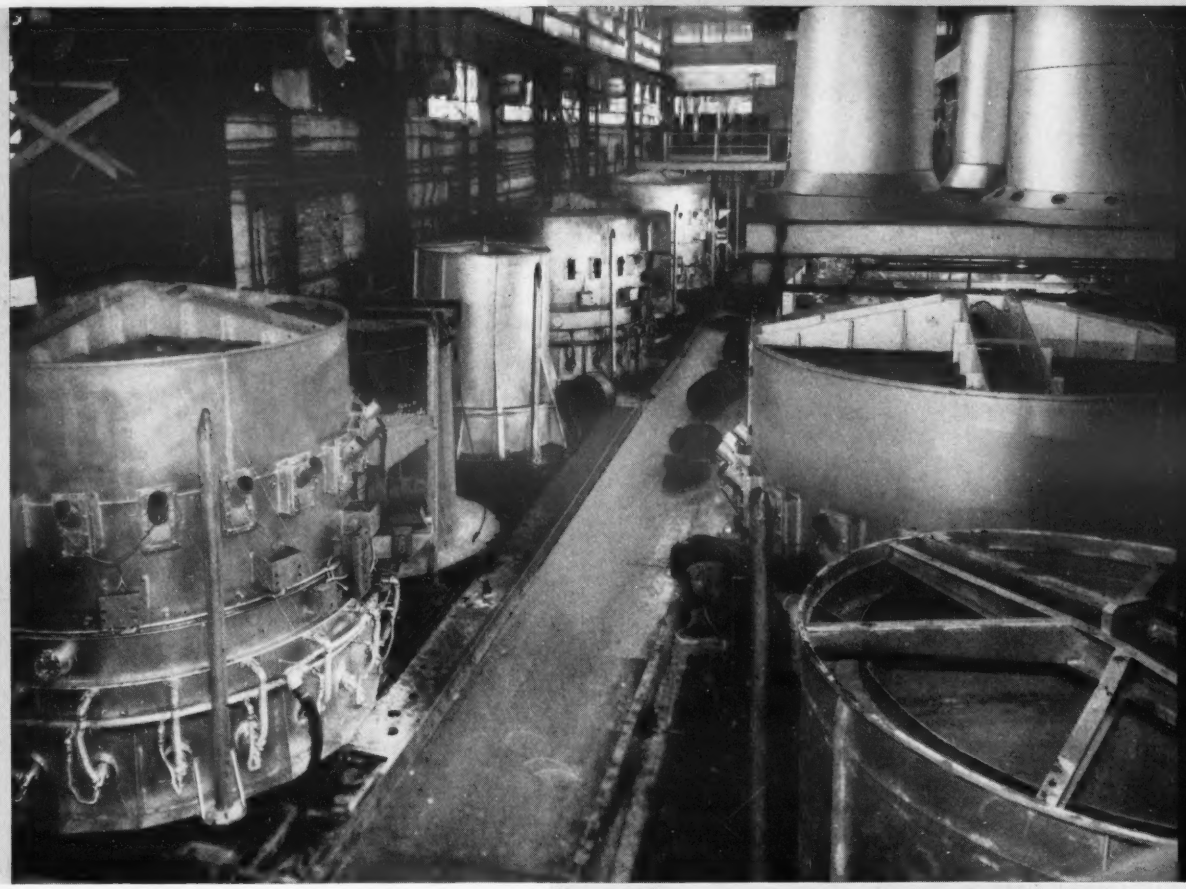
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Northwestern Expands Wire Production Capacity with

WILSON ANNEALING FURNACES



From the first furnace in 1945, this wire annealing installation at Northwestern Steel & Wire Company at Sterling, Illinois, has grown to four 74" x 84" furnaces and 12 bases in 1952.

Engineered and Constructed by the

Lee Wilson

ENGINEERING Co., Inc.

20005 WEST LAKE ROAD • CLEVELAND, OHIO

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by the

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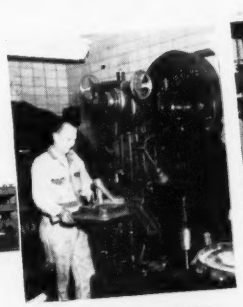
WIRE ASSOCIATION MAY 8, 1952

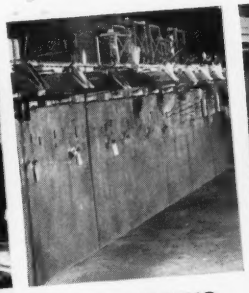
in Pittsburgh

CHARTERED BUSES WILL LEAVE WM. PENN HOTEL AT 1:30 P.M.

CARBIDE PLANT



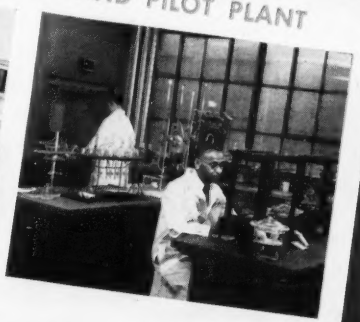
PRESSING



SINTERING

CASING

RESEARCH LABORATORY AND PILOT PLANT



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The steel industry needs these millions of tons of dormant scrap, needs it in the worst way. With this vital dormant scrap the entire steel supply picture would brighten up, with more steel for everybody. But without it, the steel industry cannot hope to keep up production at present levels.

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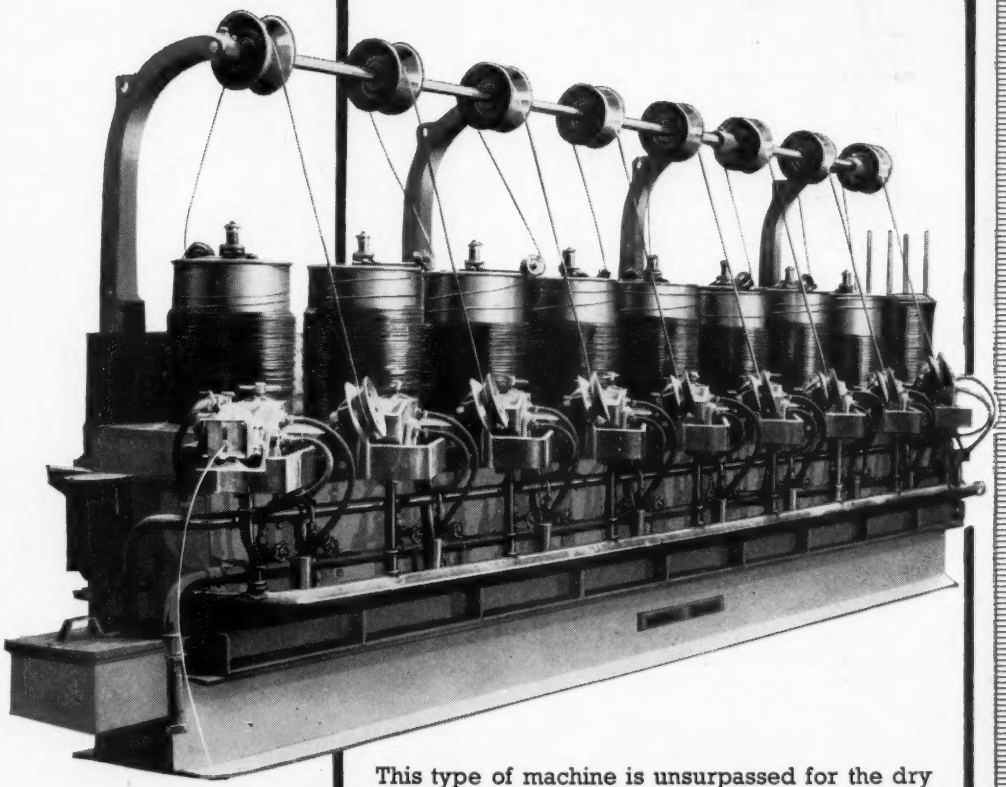
WIRE DRAWING MACHINERY

ACCUMULATION MACHINES



This type of machine is unsurpassed for the dry drawing of high carbon wire in fine sizes. Wire storage on water cooled blocks gives perfect cooling between drafts. The type A.20 illustrated can be made with 7 to 9 blocks.
Blocks: 8″ or 12″ diameter. Finishing Range: .048″ — .016″. Speeds up to 2400 feet per minute on 12″ diameter block machine.

MARSHALL RICHARDS MACHINE CO. INC.

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Telephone: TRENTON 9478 · Telegrams: MARICH TRENTON

MR6C

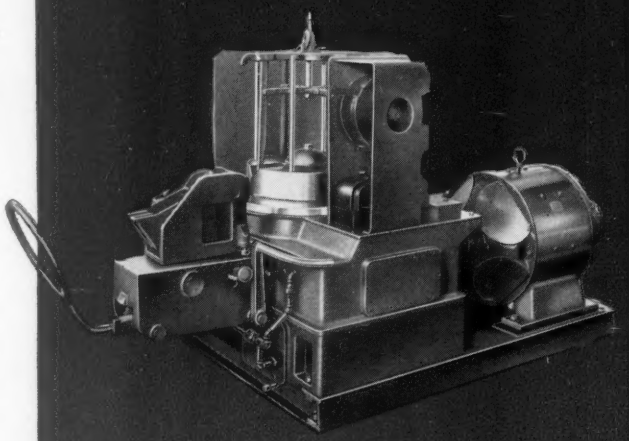
for heavy work

MORGAN WORCESTER

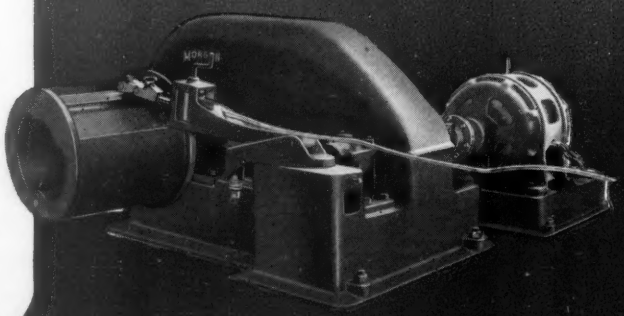
The Morgan Construction Company offers a complete line of single block, vertical spindle wire drawing machines. They are built in several sizes, with various block diameters and speeds — covering a complete range of sizes. Double-deck blocks for two drafts are available.

Numerous additional features can be incorporated in these machines. Air-cooling, if desired; either a constant speed A.C. or an adjustable speed D.C. motor may be used—a multi-speed gear unit can be used with an A.C. motor. Driving power is transmitted through spiral bevel and helical gears mounted on ball and roller bearings. Full automatic lubrication is provided. Magnetic control gives a slow start, gradual acceleration, reverse for spotting the grip and quick stopping.

Morgan Wire Block



Morgan Horizontal Bull Block



Morgan Horizontal Bull Blocks are recommended for heavy-duty, single draft work. They are suitable for sizes 1-inch diameter and smaller and equivalent sections in rounds, squares, hexagons, rectangles and other shapes.

The outstanding advantage of this type of machine is the ease and rapidity with which the drawn coil of wire may be stripped from the block. The recoil of the large sizes of wire loosens the wire on the block so the coil may be stripped easily to a hairpin hook.

The general specifications as to power, drives and controls are the same as used on the Morgan Wire Blocks.

WM-61

MORGAN CONSTRUCTION COMPANY

WORCESTER, MASSACHUSETTS

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 APRIL, 1952 No. 4

Designated as Official Publication By The Wire Association

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FLANGED STEEL TRAVERSES

... eliminate the labor of handling large numbers of small parts ... make it easy to assemble reels in four simple steps.

And, they make up into strong reels that can be used over and over. Actual experience records show as much as sixteen years' service without refinishing or major maintenance, as well as a 50% to 100% increase in the number of trips before cut downs or scrapping of wooden heads.

Niles Flanged Steel Traverses are manufactured in sizes up to 56" diameter and 48" traverse—in plain, painted or hot dip galvanized finish—as light as 18 gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. *Write for prices.*

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REPUBLIC STEEL CORPORATION

NILES • OHIO

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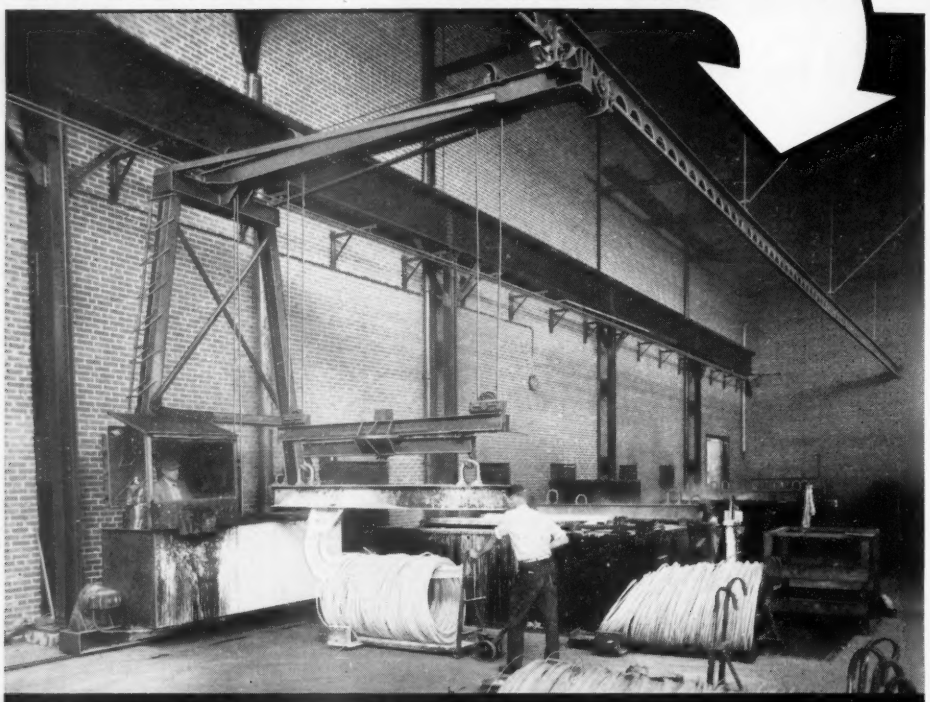
THE CLEVELAND TRAMRAIL WAY

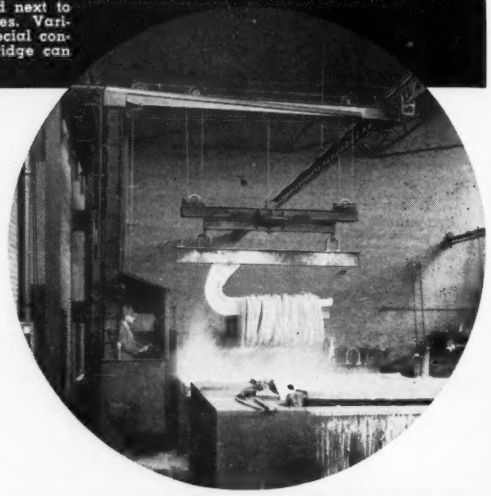


Hoisting machinery for this gantry crane is located next to operator's cab where protected from acids and fumes. Variations of this equipment have been built to suit special conditions. If desired, a movable trolley on gantry bridge can be furnished.

Nothing else that we know of can so cut costs and bring about other important advantages in a rod or wire mill, for the expenditure involved, as a modern Cleveland Tramrail cleaning house crane installation.

Cleveland Tramrail equipment completely revolutionizes cleaning house procedure and enables one man in the crane cab to run large tonnages through the cleaning cycle usually involving acid dip, water rinse, lime coating and baking. The equipment requires less than one-half the space for the old circular method and by the very nature of the layout used, a cleaner and more orderly room results.

The large number of installations now serving leading rod and wire producers attest to the advantages of the equipment. If you are interested in lower cleaning costs per ton by a method that quickly pays for the original investment, we suggest that you get the facts on Cleveland Tramrail cleaning house cranes.



3,300 lb. loads can be handled with this unit. Note the load bar is equipped with a swivel arrangement permitting turning the hook.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

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THE CLEVELAND CRANE & ENGINEERING CO.
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FLAT SPRING STEEL

You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

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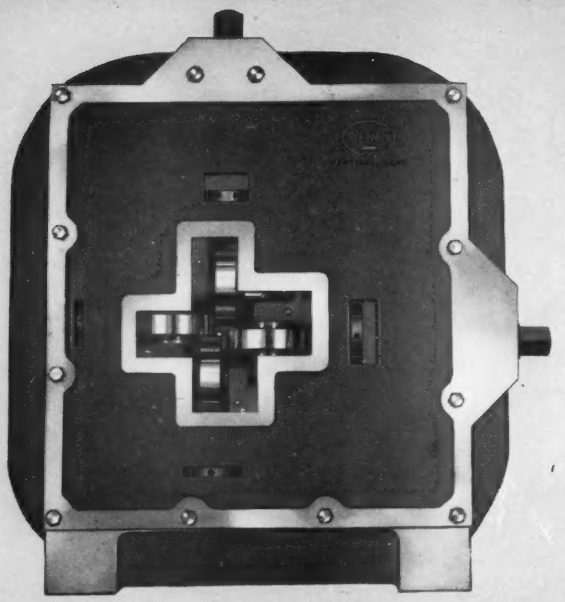
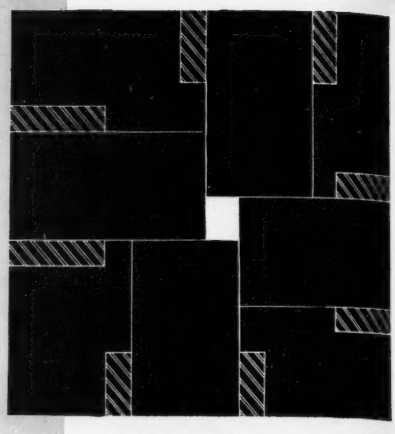


THE FENN TURKS HEAD offers many advantages over ordinary methods of shaping wire and rod. Featuring adjustable roll boxes, it *rolls* the material on both horizontal and vertical planes simultaneously. Available in friction drive or power drive.



UNIQUE FEATURE of Turks Head design is shown in this diagram of roll assembly. Four converging rolls form material to the desired shape. Square and rectangular shapes may be produced in varying dimensions by a simple roll adjustment.

Only Fenn Turks Heads bring you

MORE ACCURATE WIRE SHAPING AT LESS COST

A radical departure from the conventional draw-die, the Fenn Turks Head is characterized by the unusual operation and exceptional versatility of the die, in which the sides of the opening are four adjustable rolls. When the rod or wire is being formed into the more common square or rectangular shapes, the rolls may be adjusted to produce any width or thickness, in dimensions ranging from 0 to capacity.

EXCLUSIVE ADVANTAGES

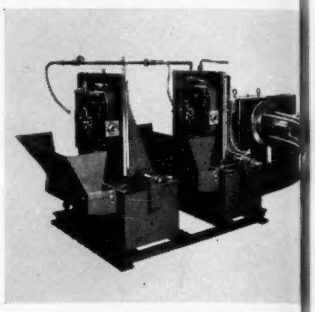
Increased Accuracy. When wire is shaped by ordinary rolling methods, the final rolling operation is apt to affect the dimensional accuracy secured by the edging process. By doing both these jobs at once — at the same point on the wire — Turks Heads eliminate this hazard. Also, since they roll *with* the work, Turks Head roll-surfaces are subjected to far less wear than rigid dies. This keeps wire sizes constant for a much longer period, to tolerances of ±.0005.

Greater Economy. Turks Heads eliminate the need for a costly inventory of stock as well as multiple dies, save the labor of frequent changing and redressing, and require less power than other methods.

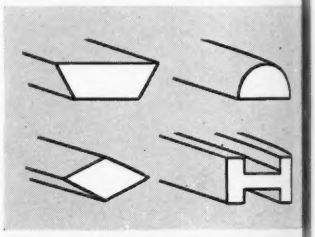
Faster. Besides their two-in-one operation, Turks Heads permit faster wire speeds.

GET THE DETAILS

on the many benefits Fenn Turks Heads can bring to your own wire-shaping operations. Contact your nearest Fenn Distributor, or write direct to THE FENN MANUFACTURING COMPANY, 1853 Broad St., Hartford 1, Conn.



FENN ROLLING MACHINES are built to take all sizes of Turks Heads, in double stand (as shown) or single stand.



ALL FROM THE SAME UNIT. Producing a wide variety of shapes from a single Turks Head is simply a matter of changing the specially ground rolls.

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BIRMINGHAM
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On our staff, we've got some of the best metallurgists in the world. They've worked on thousands of wire application problems. And—here's the best part—a problem that is new to you may be old stuff to our engineers. Maybe you're using a wire that's unsuitable for the job it has to do. No matter what your problem, our metallurgists are qualified to recommend the best type of wire for the application, and they are always ready to cooperate with you.

Anyway, if you're having trouble, it doesn't hurt to find out if we can help you.

This offer of free advice and help is nothing new. But we think you'll agree that this is a good time to repeat the offer.

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AMERICAN STEEL & WIRE DIVISION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
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AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire.*

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USS

UNITED STATES STEEL

Vitron Low-Twist Yarns speed insulating and cut costs

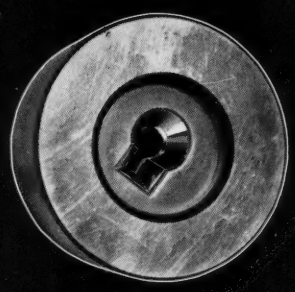
Low-Twist VITRON Yarns increase efficiency in magnet wire production, by permitting build-up control through variations in pull-out and flyer speeds. Each package serves a wide range of needs, and a sound inventory can be maintained with fewer types of packages. These savings, plus the lower cost of low-twist constructions, are cutting over-all costs in many wire processing operations.

Glass Fibers Inc. first offered low-twist in an exclusive yarn size—VITRON 300's. This program proved so successful that wire processors requested the complete range of VITRON yarns—450's, 300's, 225's and 150's—be made available in low-twist constructions.

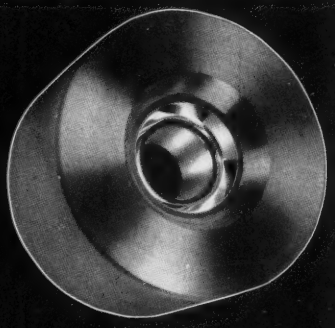
We would like to tell you how you can save money with these important products. We can show where insulating costs have been cut as much as 20% to 40% over previously used yarns by shifting to low-twist constructions. A letter or call from you today will put our engineers at your service.

GLASS FIBERS INC.
1810 Madison Avenue • Toledo, Ohio

Vitron
ELECTRICAL INSULATING MATERIALS

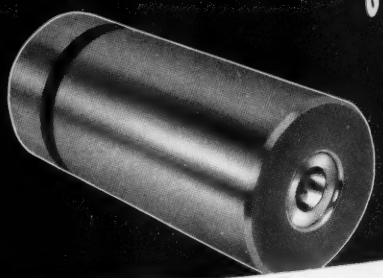


SHAPED CARBIDE DRAWING DIES



ROUND CARBIDE DRAWING DIES

Now—finish carbide dies up to 20% faster!



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ELGIN DIAMOND in DYMO-C*

*"C" for carbides.

. . . At last a diamond compound that really works on carbide dies

CUTS CARBIDE FINISHING TIME UP TO 20%!

•

FIELD TESTED AND PROVED ECONOMICAL!

•

DEVELOPED FOR USE WITH ANY STANDARD SIZING OR POLISHING METHOD!

•

READY TO USE—NO MIXING!

ELGIN "DYMO-C" is completely new . . . virgin diamond powder pre-mixed as a compound . . . specially prepared to *finish carbide dies faster!* Actual tests show time savings up to 20%! Send for complete information today . . . ask for a free demonstration on your own dies, in your own plant.

ALL ELGIN DIAMOND COMPOUNDS ARE COMPLETELY PRODUCED BY ELGIN, AND CERTIFIED TO CONFORM TO U.S. BUREAU OF STANDARDS SPECIFICATIONS

Abrasives Division

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

50 MILLS NOW USING Talide WORK ROLLS

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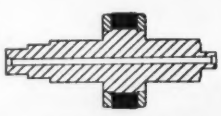
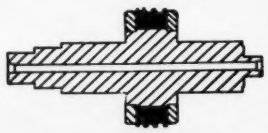
Specific Gravity GMS/CC (Density)	14.8
Rockwell "A" Hardness (60 Kilogram Load)	91
Transverse Rupture Strength (psi)	275,000
Compressive Strength (psi)	750,000
Modulus of Elasticity (psi) (Deflection)	95,000,000
Co-efficient of Thermal Expansion (per ° F.)	3.00×10^{-6}
Torsion Strength (Shearing Stress psi)	125,000
Tensile Strength (psi)	150,000
Impact Strength, Ft. Lbs. (½" Square Specimens)	9.5

● What kind of rolls do mills use today for producing paper-thin strip and many other gauges with ultra-mirror finish? The answer—Talide Tungsten Carbide Rolls. Carbide material has many inherent advantages, principally the characteristic of taking and holding a mirror-like finish which is imparted to the metal rolled. This advantage, plus many others, makes these work rolls the magic wand (as more and more mills are proving), for such items as cold rolled, copper, brass, stainless, spring steel, razor steel, alloys, carbon, aluminum, aluminum foil, tinsel ribbon and flat wire. Don't overlook the long life—the ratio of roll grinds for carbide rolls to conventional rolls is usually 25 to 1.

Send today for Catalog CR-50.



SLEEVED ROLLS FOR FLAT WIRE



FOR SHAPE WIRE

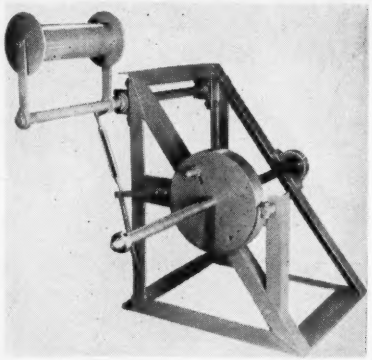
SINTERED CARBIDES
METAL CARBIDES CORPORATION
MC
TALIDE
YOUNGSTOWN, OHIO
HOT PRESSED CARBIDES

METAL CARBIDES CORPORATION

YOUNGSTOWN 7, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS · DRAWING DIES · WEAR RESISTANT PARTS

COMPLETELY AUTOMATIC SPARK TESTING EQUIPMENT FOR ELECTRIC WIRE AND CABLE



THE DAVIS PAY-OFF

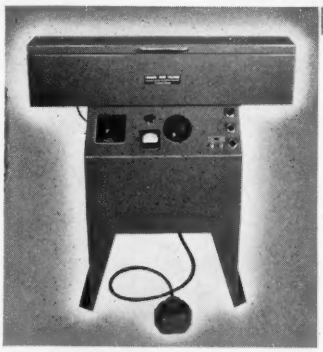
The **DAVIS PAY-OFF** is of simple design and rugged construction. Tension and braking are controlled automatically, so that over-travel of wire is prevented. It will stop instantaneously when the wind-up spool stops.

Equipped with self-aligning ball bearing pillow blocks to reduce friction and prolong the life of the mechanism.

While designed primarily for use with **DAVIS SPARK TESTERS,** this versatile machine may be used in other operations in your mill where pay-offs are needed. Will give years of dependable service.

Pay-off stands are designed for right or left. Also in shaft sizes of 1¼" or 1½". Will accommodate reel sizes up to 30" in diameter and 16" wide.

ALL DAVIS ELECTRICAL EQUIPMENT MEETS UNDERWRITERS APPROVAL



THE No. 4 SPARK TESTER

This No. 4 unit and bead chain electrode combined with a Davis Pay-off stand, a Davis Take-up, and a predetermining counter, makes a complete Respooler and Resparker.

This complete unit will Spool Test wire up to 1200 feet per minute. It automatically shuts off when the reject is found by the sparker and also when the predetermined amount of wire has gone through the counter. Footage can be increased by lengthening the electrode. The unit can also be designed to produce constant footage. Listed below are the standard bead chain type electrodes and their capacity:

18"— 500 feet per minute—up to 1" wire size
24"— 800 feet per minute—up to 1" wire size
36"—1200 feet per minute—up to 1" wire size

This Davis spark tester is so thoroughly engineered, it will, if instructions are followed, detect 99% of all faults in the insulation.

This unit can also be obtained in voltages up to 30,000. Electrodes can also be obtained to accommodate up to 2" cable.

DAVIS SPARK TESTER
OPERATES ON 110 VOLTAGE

220-440 MOTOR VOLTAGE ON ALL DAVIS EQUIPMENT —OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS.

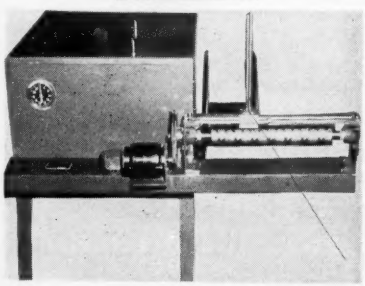
THE DAVIS PAY-OFF AND TAKE-UP IS BUILT FOR EITHER LEFT OR RIGHT HAND SHAFT.

COUNTER

The Davis predetermining counter is noted for its ease of setting and its accuracy. Mounted on its own pedestal, it can be easily moved for the convenience of the operation.

Wire size .010 to ½" also available in heavy duty model—wire capacity 3/16" - 1½" cable.

When used on a spark testing unit, its built-in switch immediately shuts off the power to your spool take-up or predetermined counter when any desired amount of wire has passed through it.



TAKE-UP

A versatile variable speed, constant tension, motor-driven mechanism that is electrically controlled.

Designed for use with the **DAVIS SPARKER,** it has nevertheless many other applications where fast and accurate lay-winding are desired.

This Take-up is equipped with an adjustable traverse that will accommodate reels up to 16 inches in width and 30 inches in diameter, with shaft sizes of 1¼" or 1½" in diameter.

The electrically controlled brake is completely automatic.

Your wire may be layer-wound by adjusting the spindle speed to correspond with that of the traverse. An automatic torque control starts the machine smoothly and slowly to prevent the breaking or stretching of wires.

The Davis Take-up unit is designed for adjustable speed ranges of 75 to 300 F.P.M. or 75 to 1200 F.P.M. A built-in tachometer indicates the speed.

TRAVERSE MOTOR 110 VOLTS—OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS

DAVIS EQUIPMENT

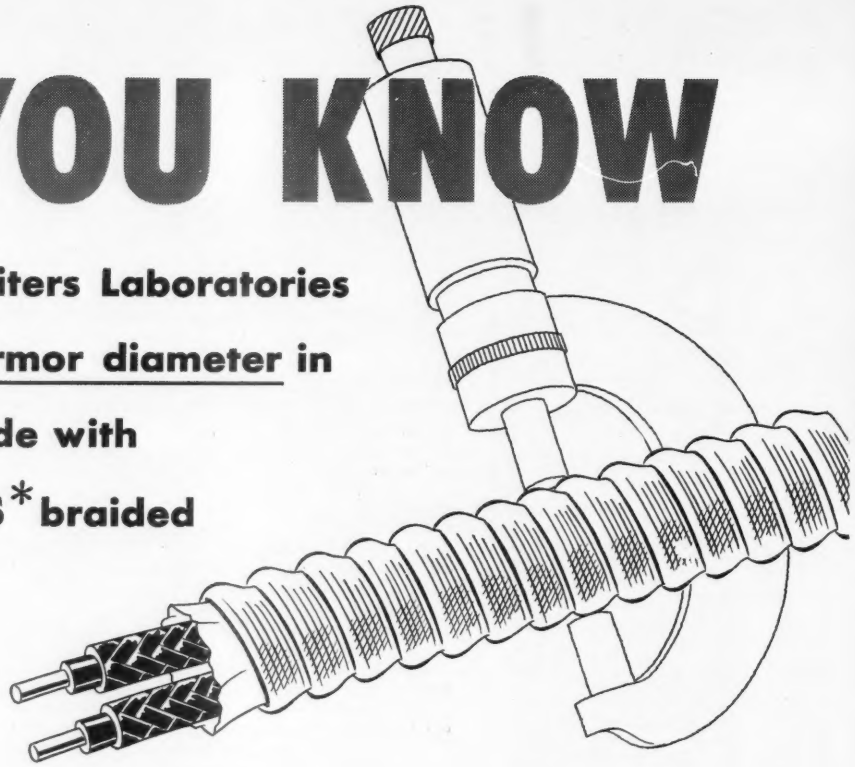
DAVIS ELECTRIC CO. WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS • PAY-OFFS • TRAVERSES

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

DO YOU KNOW

that Underwriters Laboratories permit less armor diameter in BX cable made with FIBERGLAS* braided conductors



FIBERGLAS *Yarns* IN BX CABLE

Revised Underwriters Laboratories Standards for 14/2** BX cable made with Fiberglas-braided conductors

	Cotton Braid Standard	Fiberglas Braid Standard	Difference
Solid Conductor	.474" minimum external diameter	.440" minimum external diameter	.034"
Stranded Conductor	.490" minimum external diameter	.456" minimum external diameter	.034"
Weight of armor per 100 feet (solid conductor)	14.8 lbs.	13.4 lbs.	1.4 lbs.
Weight of armor per 100 feet (stranded conductor)	15.5 lbs.	14.1 lbs.	1.4 lbs.

**similar reductions allowed in other sized BX cables.

- save space
- save armor
- will not burn
- will not rot
- will not absorb moisture
- have great tensile strength

*Fiberglas is the trademark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with fibrous glass.

For complete information about Fiberglas yarns for this and other uses, write Owens-Corning Fiberglas Corporation, Electrical Sales Division, Dept. 875, 16 East 56th St., New York 22, N.Y.

OWENS-CORNING FIBERGLAS *Yarns*

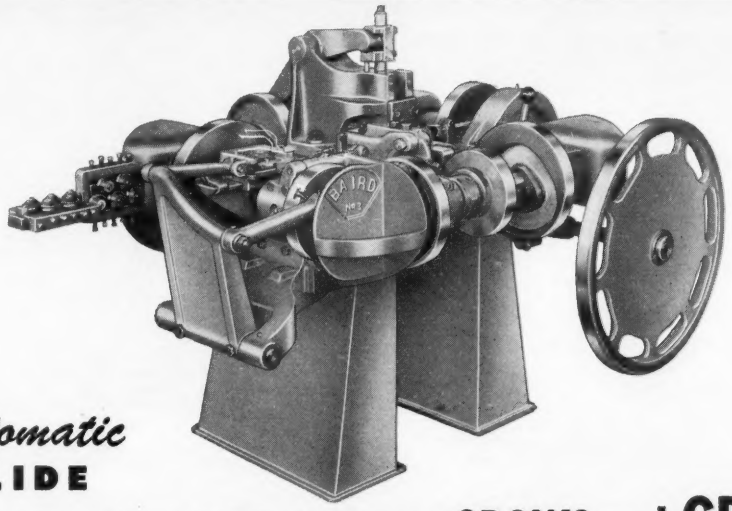
FIBERGLAS IS IN YOUR LIFE . . . FOR GOOD!

ASK

BAIRD

ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD *Automatic*
FOUR SLIDE

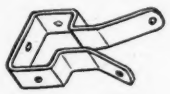
. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for either even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

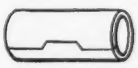
1
Horizontal Press Attachments



2
Form Raising Attachment

3
Pin Pulling Attachment

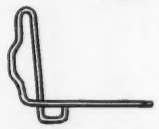
4
Setting Attachment



5
Secondary Cut-Off Attachment

6
Nail Point (Vertical Cut-Off) Attachment

7
Vertical Forming Attachment



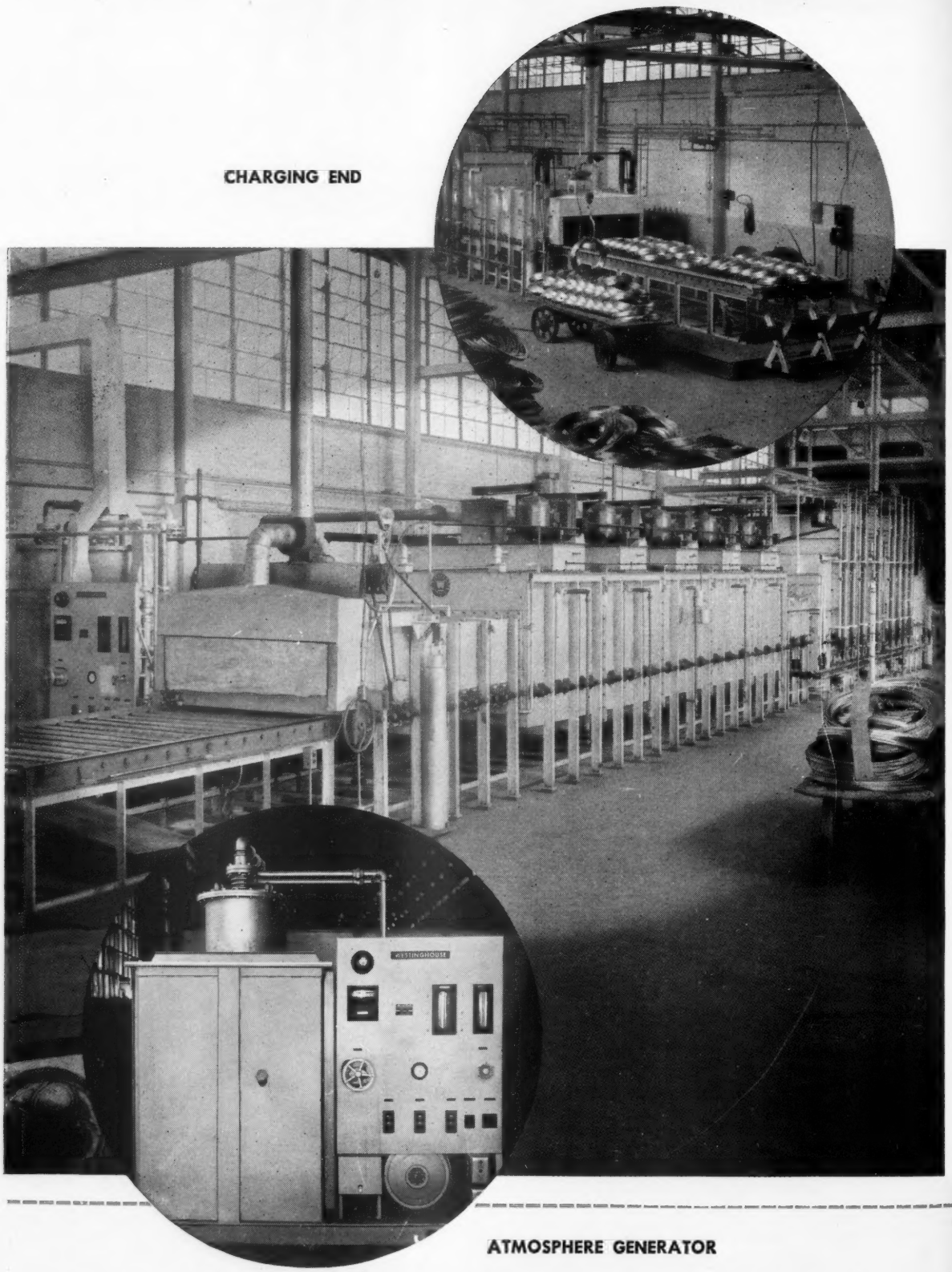
Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

48A52

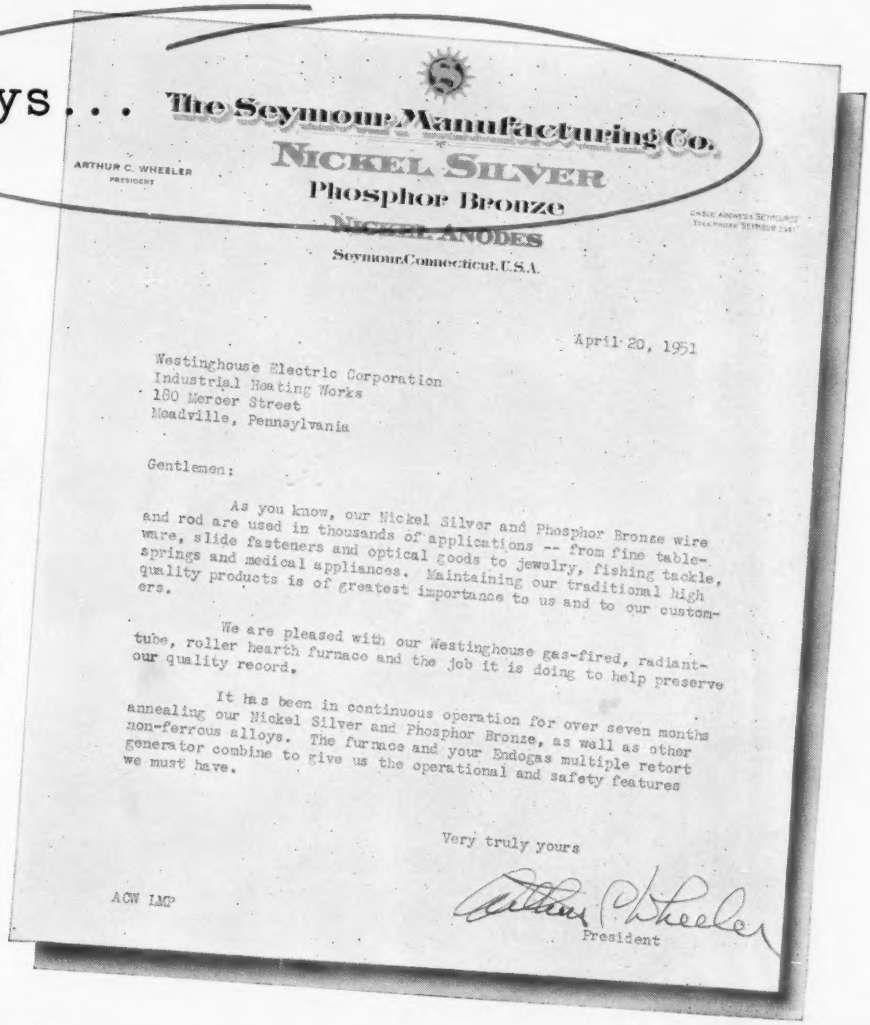
CHARGING END



ATMOSPHERE GENERATOR

"Gives us operational and safety features we must have"

says . . . The Seymour Manufacturing Co.



The Seymour Manufacturing Co.
NICKEL SILVER
Phosphor Bronze
NICKEL ANODES
Seymour, Connecticut, U.S.A.

ARTHUR C. WHEELER
PRESIDENT

April 20, 1951

Westinghouse Electric Corporation
Industrial Heating Works
180 Mercer Street
Meadville, Pennsylvania

Gentlemen:

As you know, our Nickel Silver and Phosphor Bronze wire and rod are used in thousands of applications -- from fine tableware, slide fasteners and optical goods to jewelry, fishing tackle, springs and medical appliances. Maintaining our traditional high quality products is of greatest importance to us and to our customers.

We are pleased with our Westinghouse gas-fired, radiant-tube, roller hearth furnace and the job it is doing to help preserve our quality record.

It has been in continuous operation for over seven months annealing our Nickel Silver and Phosphor Bronze, as well as other non-ferrous alloys. The furnace and your Endogas multiple retort generator combine to give us the operational and safety features we must have.

Very truly yours

ACW LMP

President

Gas-fired or electric, there's a Westinghouse Furnace to meet every heat-treating need. Select from a wide variety of standard units; or special designs can be prepared to meet particular needs. It's your assurance of an unbiased answer to your all-important problem. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pennsylvania. J-10370

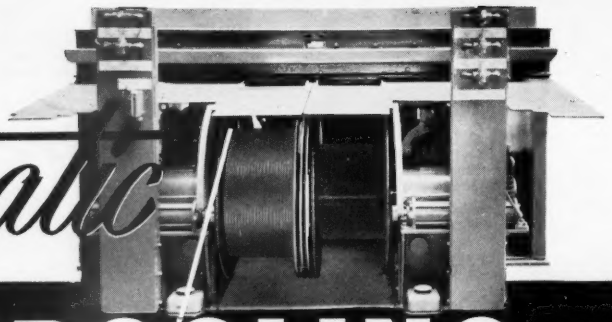
YOU CAN BE SURE... IF IT'S

Westinghouse

HEAT-TREATING FURNACES

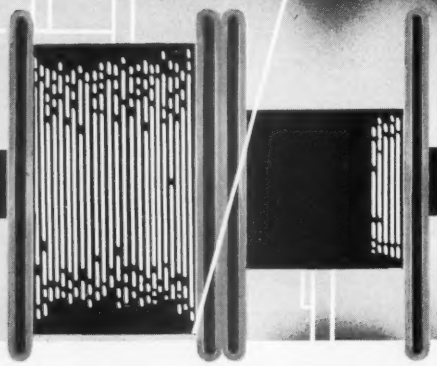
IF YOUR PRODUCT CALLS FOR HEAT-TREATING . . . IT CALLS FOR A WESTINGHOUSE FURNACE . . . GAS OR ELECTRIC

Continuamatic SPOOLING...



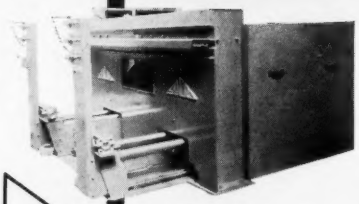
NO SHUTDOWNS

NO SLOWDOWNS

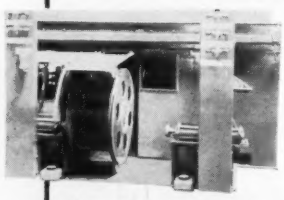


for...ALUMINUM and COPPER wire

Absolutely no shutdowns or slowdowns at operating speeds for EC ALUMINUM and COPPER wire drawing machines . . . and adaptable to your existing equipment — either Syncro or others. Handles standard reels up to 30" diameter maximum and for either hard or soft EC aluminum or copper wire in a range of sizes from ⅛" and finer. Its exceptionally fine adaptability to aluminum and copper drawing is at present of widespread interest to the wire industry. Are you "in the know" concerning this pioneered and better developed Syncro spooling improvement? We believe, without question, it is the best on the world's market. Feel free to call on us without obligation to explain to you how its many practical applications can reduce costs and increase profits!



Directly above: view shown during operation.



Wound spool ready to be replaced with empty spool. Another spool inside is still spooling without stop.

- successive starting shock loads eliminated!
- pre-determined package weights assured!
- maximum speed and spool capacity!
- no spool change-over shutdowns!
- PROVED superiority!
- safer!

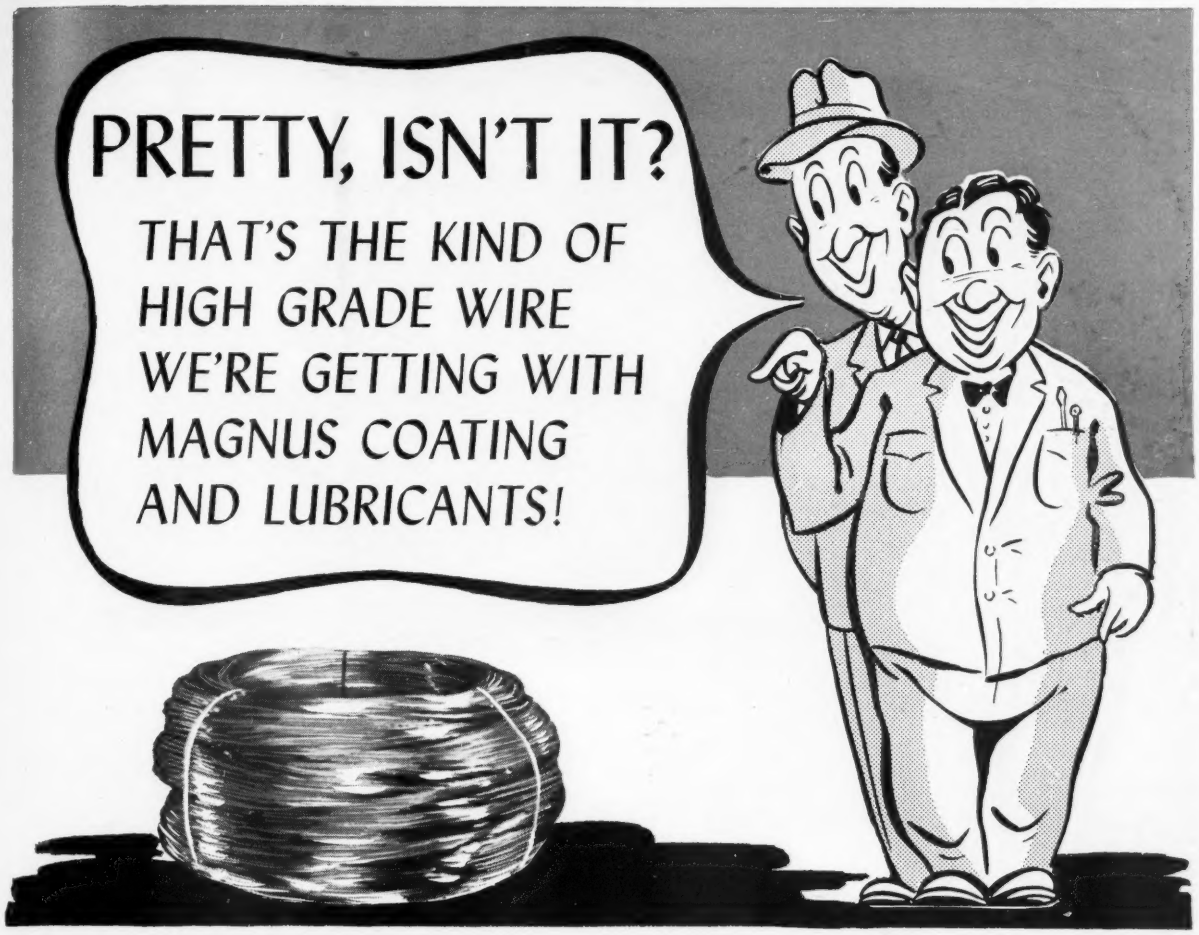
FURTHER DETAILS OF THIS ADVANCED IMPROVEMENT AVAILABLE ON REQUEST

SYNCRO®

MACHINE COMPANY

PERTH AMBOY • NEW JERSEY • USA

Machinery for the Wire Industry AFFILIATED COMPANY: WINGET-SYNCRO, ROCHESTER, KENT, ENGLAND



It's a well-known paradox of value that the best is often the lowest in ultimate cost.

Many mills, originally using Magnus Metalcoat 267, Dri-Draw #4 and other of our quality line of wire drawing materials on premium jobs ONLY, obtained over-all cost reductions per ton of wire that pointed the way to using the Magnus Method throughout the mill.

•

It won't cost you a cent to try these methods on your toughest problems. Drop us a card or letter.

MAGNUS CHEMICAL COMPANY, INC.
188 South Avenue, Garwood, N. J.

IN CANADA—MAGNUS CHEMICALS, LTD., MONTREAL
Service representatives in principal cities

Magnus
CLEANERS • EQUIPMENT • METHODS

Wire Heat Treating Units

Scratchboard Drawing for Pittsburgh Steel Company by T. W. Hunter

Progress in Steel

New Oil-Tempering Units Improve Wire Quality

In order to better serve steel users, Pittsburgh Steel Company includes in its Program of Progress the diversification of its line of products.

For example, the two oil-tempering units shown above have been installed to produce high-quality, oil-tempered spring wire. The new product is made by a closely controlled continuous process in which the wire is heated to a predetermined temperature, quenched quickly in a hot oil bath and then "tempered" by passing it through a bath of molten lead. This hardens and toughens the wire, increases its tensile strength—makes it suitable for mechanical springs such as those used in planes, tanks and jeeps, as well as in automobiles, trucks, diesel locomotives and agricultural equipment.

Pittsburgh Steel's policy of expanding its line of products as a part of its Program of Progress has extended into the field of flat rolled products. Last year, the Thomas Steel Company at Warren, Ohio was acquired, thus marking the entry of Pittsburgh Steel into the flat rolled product market. This year a new 66-inch continuous hot strip-sheet mill and a new 66-inch 4-stand, 4-high tandem cold reducing strip-sheet mill will go into operation at the Allenport Works. Another step in the Program of Progress—the new blooming-slabbing mill at the Monessen Works—has been completed. It is handling the increased flow of ingots coming from the enlarged open-hearth furnaces which this year will produce an extra half-million tons of steel. To help make this possible, blast furnace capacity is being increased by 100,000 tons a year.

The entire Program of Progress at Pittsburgh Steel is an important part of the steel industry's answer to the need for more and better steel to help defend the free world while still supplying reasonable civilian requirements.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

. . . your guarantee of

superior wire drawing lubricants

- STEELSKIN CxH Wire Drawing Powder for high speeds and high reduction of either high or low-carbon wire.
- STEELSKIN X-2 Wire Drawing Powder for low-carbon wire drawing. Produces brighter wire than metallic soap compounds.
- STEELSKIN #76 Wire Drawing Powder for dry drawing of high and low-carbon wire on continuous machines.
- STEELSKIN W coating compound for less rust, better die life, cleaner finished mill.

Always specify STEELSKIN lubricants for metal drawing.

Steelskin LUBRICANTS

R. H. MILLER
Company, Inc., Homer 1, N. Y.

"I wonder what happened to me !" said Alice

ALICE in Wonderland ate the magic cake and grew until she was more than nine feet tall. Our National bureaucracy also seems to have partaken of the magic cake of power. Bureaus in our government have grown in number and scope until their activities now control, to a great extent, the lives of all individual Americans. Department after department adds more and more people -- state, justice, commerce, treasury -- not to mention those sprawling emergency born agencies of price control, N.P.A. and other alphabetical subdivisions.

The number of employees of our federal, state and local governments continues to grow. During many recent months, personnel was added to the federal payroll at the rate of 1,500 daily.

What is the reason for this mushrooming? The Korean War? Threat of war in Europe, Southeast Asia, or the Middle East? Obviously not! A glance at the federal budget gives the answer. The estimated cost of all governmental functions for the fiscal year 1952 is in excess of 70 billions of dollars, an increase of 26 billions, or approximately 60% more than last year.

When will it end? Only you, the individual citizen, who carries the bureaucratic load on his back, can stop it. It will end when enough patriotic men and women demand from congress that the Washington Wonderland start shrinking back to reasonable proportions.

YOUR SCRAP YOUNGSTOWN IS NEEDED

The Youngstown Sheet and Tube Company

General Offices -- Youngstown 1, Ohio
Export Offices -- 500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

NOTHING BUT REELS ARE MADE BY BRIDGE

WOOD REELS
for
CABLE • ROPE • WIRE
12" to 96" in diameter. Knocked down or assembled. Returnable or non-returnable. Reel heads for steel drums.

Above: First step in forming reel heads

KEEP YOUR MILL SUPPLIED BY A REEL SPECIALIST

It will assure you of sturdy, strong, precision-made reels of highest quality. Our straight-line production methods make reels for you at the lowest possible cost.

Every operation is automatic, with specially designed tools and jigs that produce reels to your own specifications that you can depend upon for satisfactory service.

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

Vertical Individual Wire Drawing Bench for Large Diameter Wire...

Draws round, shaped or flat wire... iron, steel or non-ferrous materials.

Die holder can be adjusted vertically and horizontally, regulated for different size and shape wire.

Handles carbide and steel dies.

Stripping spider simplifies changing drawing blocks.

Electrically operated, including reversible rotation of drawing block—Push button control.

Maximum pull 11,000 lbs.

Herborn Model V. G.

KO INC. INDUSTRIAL REPORTERS

KURT ORBAN COMPANY, INC.

205 East 42nd St., New York 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit

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STAYS BRIGHT AS DAY!

STANDARD'S NEW BRIGHT WIRE COMPOUND

STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with STANDARD for the solution of your difficult problems. We welcome your inquiries.

FOR DRAWING COPPER-COATED WIRE

QUALITIES

- **A** Draws well
- **B** Makes exceptionally bright wire
- **C** Finish *remains* bright
- **D** Long lasting. Can be cut back with water when heat of drawing thickens it.

Write home office or contact one of our sales engineers for further details.

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Standard Industrial Compounds Co.
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Arthur J. O'Mara

wire drawing lubricants

Standard INDUSTRIAL COMPOUNDS CO., INC.

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

SELL YOUR BRASS MILL SCRAP PROMPTLY

To keep production rolling

Help lick the shortage of brass and copper. Make sure that every pile of brass mill scrap in your factory — even if it is only a hundred pounds — is sold at once.

Not only is this scrap immediately salable on today's market — it will bring vital metal to the production lines where it is sorely needed.

Both the defense program and civilian needs require more and more copper and brass. To prevent increased shortages and even more stringent regulations, see that *your* brass mill scrap is moved promptly.

Chase® BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston†	Newark	Rochester†	(†sales office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	

Sweet Music For Wire Makers!

ANNOUNCING A NEW GREATLY IMPROVED WIRE TAKE-UP

U. S. Patents Pending

Here is a totally new take-up unit for thermo-plastic or rubber wire insulating assemblies. The new Davis-Standard Take-up has advanced features which afford greater efficiency and dependability and also overcome certain disadvantages which long have been annoyances in the wire industry.

The Take-up has no gears or clutches, and is built to operate smoothly, silently and with a minimum of vibration at high production speeds.

Reel drive is multiple double V-belts, with a brake which automatically stops the reel as it is disengaged. Traverse mechanism is of entirely new and improved design, smooth and positive in operation.

The reels are shifted in and out of engagement by air and the reel is located at floor level to eliminate danger of damage due to dropping. The reel arbor is removable and provision can be made for coiling heads if desired. Automatic cut-over is also available.

A choice of speed ranges and an improved type dancer column provide for constant tension control.

The unit is built in sizes to take reels from 6" to 36" and larger sizes can be furnished to order. The machine is rugged and insures high production throughout 24 hour operation.

To see how completely this new take-up makes old types obsolete, write for detailed specifications.

THE STANDARD MACHINERY COMPANY

14 WATER STREET, MYSTIC, CONNECTICUT

MOLDING PRESSES AND EXTRUSION MACHINES

· World's Largest Manufacturers of Custom-Built Extrusion Machines

Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.

For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

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BUFFALO, N. Y. AMherst 3838	HARTFORD, CONN. 32-5197	LOS ANGELES, CAL. LOgan 5-9811	NEW YORK, N. Y. MUrray Hill 3-0291	ROCKFORD, ILL. Enterprise 2504	SYRACUSE, N. Y. Enterprise 9593
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CINCINNATI, OHIO Redwood 2553	INDIANAPOLIS, IND. Plaza 3946	MILWAUKEE, WISC. Division 2-0204	PHILADELPHIA, PA. TEnnessee 9-5478	ST. LOUIS, MO. MIssion 0113	YORK, PA. Enterprise 945
CLEVELAND, OHIO CHerry 1-0277	KALAMAZOO, MICH. Kalamazoo 5-4294	MINNEAPOLIS, MINN. Bridgeport 2792	PITTSBURGH, PA. HIland 1-8548	SAN FRANCISCO, CAL. YUkon 6-6505	

IN CANADA: (TOOLS) CARBIDE TOOL CO. W. Toronto 9, Ont. (DIES) VASCARB TOOL & DIE CO. Hamilton, Ont.

The Wire Outlook

Opinion on the current trend is mixed. The January to July rate of production is expected to be high with perhaps a mild downturn by mid-year. The possibility of this, of course, is tempered by the degree of activity of the defense program, as Government military spending is an important factor in periods of civilian product restrictions and material controls.

However, while there may be more total business done, it is estimated that fewer concerns are doing it in spite of the efforts to channel Government contracts to small concerns. Yet the U. S. Director of Employment Security sees increasing employment, with some 63,000,000 persons holding gainful jobs by midsummer—if it works out, it will be a record.

Inflation again rears its ugly head as the steel wage dispute waxes hot and strikes are threatened. Should wage increases be granted, it will be the sixth round in the inflationary spiral and will most certainly increase prices all along the line. It is true that wages and salaries are buying less. The rail strike, quickly squelched in March, was caused by the dissatisfaction of the employees over their smaller dollar. A new round of increases will solve nothing, but will again bring us all back to the same condition of a dollar further shrunk by rising prices.

The real culprit in the inflationary trend is the type of Government fiscal policy that has been in effect since 1934—that of lavish spending far in excess of income. There will be no material change in the trend until we have another administration that is dedicated to wise and frugal spending.

The labor mood is tough and belligerent. Probably the rank and file don't understand the economics of our national situation. Their leaders should, but seem to be motivated by a "get-more-regardless" policy that neglects the fundamental issues of cause and effect. Our labor leaders, Congressmen and those in the Executive branch in Washington should be high-minded men of statesman calibre, but it has long been evident that only a few are in this category.

Members of the aluminum industry are pressing for an easing of controls. A high source in the DPA even went so far as to predict complete decontrol of this metal by the end of this year.

In steel, a spotty tendency toward easier demand is noted. The tin outlook has improved as a result of the new contracts for foreign tin. There is a lessened demand for zinc for die castings, but the shortage of the quality suited to galvanizing is unchanged. Lead is now in approximate balance for military and civilian demands.

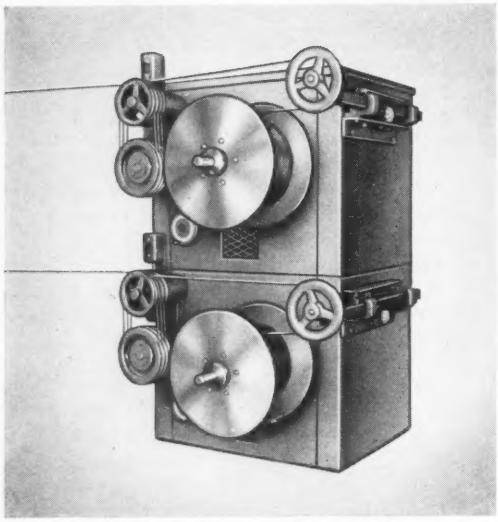
Copper is one metal that continues to be critically short. Some increased allotments are expected in the second quarter for civilian goods. Our 1950 consumption was 2,163,000 tons. While some domestic production increases are expected by the end of the year, the DPA estimates that it will be 1955 before the supply equals or exceeds the demand. Stockpiling has aggravated the shortage, with, it is said, enough now on hand to take care of military needs for five years.

Most wire buying is now geared to production schedules, with steel rods and wire readily available in most types.

In a presidential election year business is usually expected to be poor. It is doubtful that this year there will be any slackening of activity on this account, but there is no doubt that a material change of faces in Washington as a result of the November contests would greatly hearten businessmen and go a long way toward assuring us of the preservation of our system of free enterprise.

—from the Editor's Desk

AUTOMATIC REELER CLASS R



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4. Type R Reelers available with single constant-wire-speed to customer's specification.
5. Type RA Reelers available with adjustable constant-wire-speed up to 6-to-1 ratio.
6. These JLE Reelers are available in right-hand and left-hand assemblies allowing one operator to conveniently run as many as six machines.
7. Types R-30 and RA-30 Reelers (handling reel sizes up to 30 in. diameter) are available. These units cannot be stacked.

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See Page 398 for a complete listing of JLE Products for the Insulated and Bare Wire Industry

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WIRE
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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 APRIL, 1952 No. 4

Neoprene Wire and Cable Coverings

by Henry E. Charles, Research Engineer
The Okonite Company, Hazard Division
Wilkes-Barre, Pennsylvania

In this article the author has traced the development in the use of Neoprene, especially with reference to its use in the wire and cable industry. The characteristics and the economies of the material also are set forth to indicate where and how it may be used to advantage by manufacturers.

When a new material, particularly a chemically synthesized one, is developed and production soars to a hundred million pounds a year in less than twelve years time it certainly deserves attention. In the light of this rapid growth the material has obviously produced a trend in its usage, and du Pont's synthetic rubber — neoprene — has done just that. Remarkable also is the fact that one industry—the wire and cable industry—consumes between one-quarter and one-third of the total available.

★ ★ ★

The earliest thought of synthetic rubber appears to have arisen at the close of World War I. The du Pont Company began paper study in 1924 and during the following year the laboratories accomplished the oxidation of acetylene to diacetylene followed by reduction to butadiene. Late in 1925 **Dr. Bolton** heard **Father Nieuwland's** paper entitled "The Polymerization of Acetylene" and arrangements were made for Father Nieuwland to continue his work with du Pont. The result was the actual production in 1928 of considerable quantities of monovinyl acetylene. In 1930 the late **Dr. Wallace H. Carothers** at du Pont added hydrochloric acid to monovinyl acetylene resulting in chloroprene which could be polymerized. This work was disclosed in a paper "Acetylene Polymers and Their Derivatives" given in Akron in November 1931. Its tradename was registered as "DuPrene". Production started in 1931 and this entirely new raw material was introduced to the market and first sold commercially in 1932. So the chain was complete; coal and limestone synthesized to form calcium carbide, converted to acetylene by means of water and catalyzed to monovinyl acetylene which, when added to hydrochloric acid (made from salt), produced the first commercial thermosetting synthetic rubber.

★ ★ ★

The chemical composition of this synthetic rubber — neoprene — is different from natural rubber and on the basis of strict economics cannot be called a natural rubber substitute because it has always cost more than rubber. Despite the price differential, the early years of neoprene production saw the total double each year until in 1941 production was over ten million pounds. World War II necessitated quadrupling the capacity of new facilities already under way. When these facilities were completed, production in 1944 totaled over one hundred million pounds. 1945 and 1946 continued at the same rate. Postwar years of 1947, 1948 and 1949 were maintained at approximately seventy per cent of this figure. The Korean Crisis in 1950 again increased the necessity for neoprene and production returned to more than one hundred million pounds.

★ ★ ★

The most significant fact in the development of neoprene is the trend of its increasing use in the wire and cable industry. For many applications neoprene has replaced almost all materials previously used for overall coverings . . . such as natural rubber sheaths, fibrous servings, weaves and braids, and (most important of all) lead sheaths. The following Table shows the extent of neoprene consumption by the wire and cable industry for the years 1940-1950 inclusive. Note especially the last column which indicates the increasing trend in neoprene consumption particularly in the past five years, which are most

representative of the usual production of the industry.

★ ★ ★

Neoprene is prepared very much like rubber in manufacturing sheathing materials. It is combined in a conventional Banbury Mixer with suitable fillers, reinforcing pigments, plasticizers, accelerators and antioxidants. Generally speaking, neoprene does not require the addition of sulphur for vulcanization. This feature is important where sulphur corrosion is a factor. The inherent properties of a typical neoprene sheathing compound are:

(1) Specific gravity of 1.5 as compared with 1.2 for natural rubber.
(2) Tensile strength (2000 to 2500 pounds per square inch).
(3) Elongation (300 to 400%).
(4) Good abrasion and tear resistance.
(5) Permanent set of same order as natural rubber but of slightly slower rate.
(6) Better thermal conductivity than natural rubber.

(See Table I Below)

★ ★ ★

Neoprene's most outstanding characteristic is its oil resistance. Swelling of neoprene is much less than rubber when immersed in all types of oils . . . the more harmful asphaltic base oils, paraffin base oils, vegetable oils, animal fats and fish oils. In addition, tensile strength, toughness and abrasion resistance are retained to a much larger degree after such immersion. This quality, together with its extreme resistance to the effects of exposure to sunlight, makes neoprene vastly superior to rubber for most sheath uses. The effects of ozone on neoprene sheaths are very slight, making them suitable for use on higher voltage cables.

★ ★ ★

The use of neoprene as an overall covering for wires and cables originated in low voltage (0-600) systems, particularly on secondary network cables where heavy fibrous braids were previously used. It has extended to millions of feet of Underground Service Entrance Cable where layers of tape and jute, fibrous braids or lead sheaths (some with steel armor) were formerly common. This is also true for airport lighting, street lighting and power distribution cables up to 7500 volts.

★ ★ ★

Economics always dictates a policy of seeking lower cost materials. Since the prices of other materials have been rising for years and the future availability of lead has become more doubtful, neoprene is a natural for replacement of these other materials. Since the demand for low-cost electrical power distribution appears to be ever increasing, the need for lower cost wire and cable is apparent. Neoprene-sheathed cable is the simplest construction yet produced; it consists of conductor, insulation and sheath. Not only is it lower in cost than its counterparts . . . it is much easier to handle in installation.

★ ★ ★

Table I

Year	Total Neoprene Produced-Pounds	Neoprene Used in Wire & Cable-Pounds	% of Neoprene Production Used in Wire & Cable	Neoprene as % of Total Rubber Used in Wire & Cable
1940	5 116 000	575 000	11.2	1.3
1941	10 214 000	1 403 000	13.8	2.8
1942	17 097 000	2 144 000	12.5	3.3
1943	63 186 000	15 693 000	24.8	21.8
1944	109 422 000	28 013 000	25.6	35.0
1945	94 865 000	17 093 000	18.0	22.8
1946	102 510 000	15 990 000	15.6	23.5
1947	70 372 000	19 626 000	27.9	25.2
1948	72 786 000	25 120 000	34.5	32.0
1949	70 357 000	26 782 000	38.0	38.2
1950	100 395 000	34 569 000	34.6	43.3

Fibrous types of cable are saturated and filled with asphaltic materials for weatherproofing. A familiar sight in many aerial installations of power distribution cables is the festooning of fibrous coverings when the saturants have disappeared. Obviously, this cannot happen with neoprene sheaths. Lead-sheathed types are heavy to handle, relatively rigid and somewhat difficult to terminate and splice since molten lead is necessary for lead wipes. Neoprene-sheathed cable, on the other hand, is very simple to terminate and splice; only tape and ordinary tools are required. Further, the corrosive tendency of unprotected lead sheaths has always been a problem but with neoprene, corrosion problems are eliminated. Other advantages of neoprene-sheathed cables are greater flexibility, lighter weight, resistance to moisture in soil, elimination of sheath losses, prevention of corrosion problems due to electrolysis or galvanic action and simplicity of terminating and splicing.

★ ★ ★

Neoprene's flame-resistance is another outstanding feature applied to its full extent during World War II. The Navy Department purchased many different flame-resistant neoprene sheathed cables designated as Type OP. This characteristic flame-resistance of neoprene sheaths makes them especially adaptable to mine use where combustible gases are present. Already all portable cables for mine use must pass a rigid flame test consisting of 400% current overload and a flame application to the exterior surface. Neoprene-sheathed cables are able to fulfill the requirements that the flame must extinguish itself and propagation be limited to six inches.

★ ★ ★

Neoprene-sheathed wires and cables are highly resistant to soil acids, alkali and duct waters. It is important, however, that the bond between the neoprene sheath and insulation be strong and the layers practically inseparable. The use of the strip-covering process—where all the layers are applied in one operation, enclosed in metal mold and vulcanized simultaneously—is particularly effective for insuring this

bond. Regular methods of extrusion employing adhesives are also satisfactory.

★ ★ ★

The action of fungi and soil microorganisms is relatively slight. Neoprene's impact resistance is excellent and it is not readily deformed at high temperatures. The low temperature limit for installation of neoprene-sheathed cables, depending on the composition, ranges from —40 to —65 C. Neoprene-sheathed wires and cables are recommended for every type of application, particularly where oil and grease are encountered, such as on power tools.

★ ★ ★

Wire and Cable Industry standards are well established for neoprene sheath thicknesses for the various types of wire and cable applications as listed in the following Tables:

(See Table II)

★ ★ ★

The neoprene sheathing material used in standard items conforms to A.S.T.M. Specification Designation D752 entitled "GR-M Polychloroprene Sheath Compound for Electrical Insulated Cords and Cables" —first issued in 1943 and revised and brought up to date annually. Most consumer's specifications are written around this specification or refer to it directly. It is recommended and used by practically all engineering bodies. The physical requirements before and after accelerated aging are as follows:

(See Table III)

★ ★ ★

The above covers most general wire and cable products used in power distribution including feeders and branch circuits. In addition, there are many special types such as telephone drop wire — most of which is now neoprene-sheathed, nonmetallic sheathed building cable, shot-firing cord, pole and bracket cable, control and signal cable, communication cable, gas tube sign and oil burner ignition wire and many automotive wires and cables where oil and grease are a problem. The newest application of neoprene is as covering for conductors in weatherproof wire, replacing asphaltic-saturated fibrous coverings. The most serious disadvantage of the

Table II
NEOPRENE SHEATH THICKNESSES

Permanent or Stationary Installations

For Conduit and Underground Duct Uses

Size AWG or MCM	Single Conductor Non-Shielded 0-5000 Volts Voltage: 0-600	601-1000	1001-2000	2001-3000	3001-4000	4001-5000
	Sheath Thicknesses - 64th of an Inch					
14-9	1	1	1	-	-	-
8	1	1	2	2	2	2
6	2	2	2	2	2	2
4	2	2	2	2	3	3
2	2	2	2	3	3	3
1-3/0	3	3	3	3	3	3
4/0	3	3	3	3	4	4
225-1000	4	4	4	4	4	4
1250-2000	5	5	5	5	5	5

For Aerial and Direct Burial Uses

Size AWG or MCM	Single Conductor Non-Shielded 0-5000 Volts Voltage: 0-600	601-1000	1001-2000	2001-3000	3001-4000	4001-5000
	Sheath Thicknesses - 64th of an Inch					
14-9	3	3	3	-	-	-
8	3	3	3	3	3	4
6-4	3	3	3	4	4	4
2	3	4	4	4	4	4
1	4	4	4	4	4	4
1/0	4	4	4	4	4	5
2/0	4	4	4	4	5	5
3/0	4	4	4	5	5	5
4/0	4	5	5	5	5	5
225-300	5	5	5	5	5	5
350	5	5	5	5	5	6
400	5	5	5	5	6	6
450-500	5	5	6	6	6	6
550-900	6	6	6	6	6	6
1000	6	6	6	6	6	7
1250-2000	7	7	7	7	7	7

A compound-filled tape or a braid may be used between the insulation and sheath on sizes 1 and larger

For All Uses and All Voltages

Diameter Under Sheath - Inches	Single Conductor Metallic Shielded	Multiple Conductor
	Sheath Thicknesses - 64th of an Inch	
0 - .425	3	5
.426 - .700	4	6
.701 - 1.050	5	7
1.051 - 1.500	6	8
1.501 - 2.000	7	9
2.001 - 3.000	8	10
3.001 and larger	9	12

Flexible or Portable Use

Diameter Under Sheath - Inches	Sheath Thicknesses - 64th of an Inch
0 - .225	2
0.226 - .325	4
0.326 - .430	5
0.431 - .540	6
0.541 - .640	7
0.641 - .740	8
0.741 - .850	9
0.851 - 1.100	10
1.101 - 1.320	11
1.321 - 1.550	12
1.551 - 1.820	13
1.821 - 2.050	14
2.051 - 2.300	15
2.301 - 2.550	16
2.551 - 2.800	17
2.801 - 3.060	18

fibrous covered types is the loss of the saturant due to weathering until the fibrous covering is dry, whereupon continued weathering rots it to disintegration point and it falls off the wire. Present indications are that neoprene covered weatherproof wire, which will not rot or festoon, is rapidly replacing the former type.

Table III

Physical Properties	A.S.T.M. D752 Specification Requirement
Unaged	
Tensile Strength, pounds per square inch	1800 min.
Tensile Stress @ 200% Elongation	500 min
Elongation from 2", percent	300 min
Set Test	2-3/8" max
After 96 Hours in Oxygen Bomb at 70 C	
Tensile Strength, pounds per square inch	1600 min.
Elongation from 2", percent	250 min.
After 168 Hours in Air Oven at 70 C	
Tensile Strength, pounds per square inch	1600 min.
Elongation from 2", percent	250 min.
After 18 Hours in Oil at 250 F	
Tensile Strength, pounds per square inch	60% of unaged, min.
Elongation from 2"	60% of unaged, min.

PACIFIC COAST REGIONAL MEETING PROGRAM

JUNE 13, 1952, LOS ANGELES BILTMORE HOTEL, LOS ANGELES, CALIF.

Plans have been completed for an exceptionally fine regional meeting that will be devoted to galvanizing and insulated wire.

THE PROGRAM

A.M.—The morning hours will be taken up by registration and informal get-togethers.

P.M.—After lunch, a plant inspection trip will be made to the mill of The K. H. Davis Wire and Cable Corp.

EVENING—A "cocktail hour" (at 6:30 P.M.) will precede the dinner, which will start at 7:30 P.M. A prominent member of the steel and wire industry will address the gathering following the dinner with a message that will be of interest to all. Following a short intermission, there will be held the regular technical session with two papers. The first will be a paper entitled "The Evolution of the Modern Galvanizing Pot" to be presented by Wallace G. Imhoff, President of The Wallace G. Imhoff Co., North Highlands, Cal. Mr. Imhoff, a well-known consulting engineer and authority on galvanizing will discuss the latest galvanizing pot designs.

A second paper, being arranged for, will be on a subject of interest to manufacturers of insulated wire and cable.

R. J. Tremblay, General Superintendent of Bethlehem Pacific Coast Steel Corp., Los Angeles, will serve as Chairman of the meeting.

Committee

Earl R. Potter, Pres. and Genl. Mgr., Industrial Wire Products Corp., Los Angeles, Cal., Chairman.
Kenneth H. Davis, President, K. H. Davis Wire and Cable Corp., Los Angeles, Cal.
Richard E. Brown, Publisher, Wire and Wire Products, Stamford, Conn.

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THE WIRE ASSOCIATION

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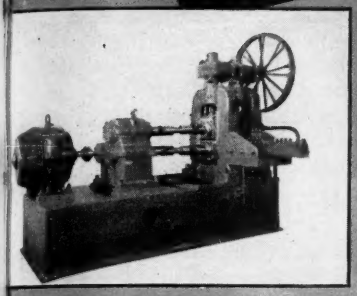
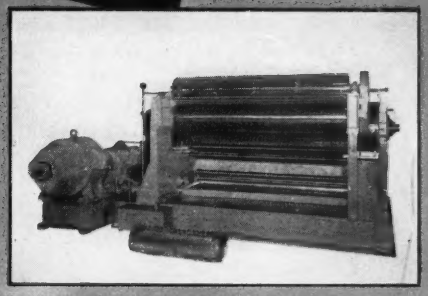
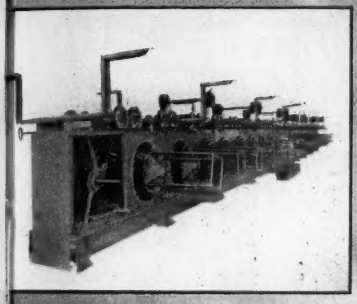


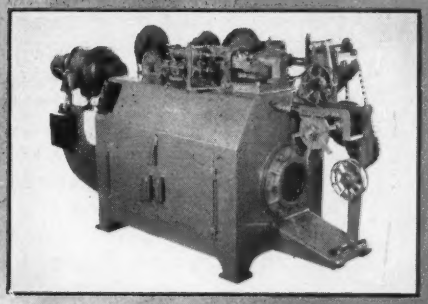
2—Hi Wire Flattening Mill



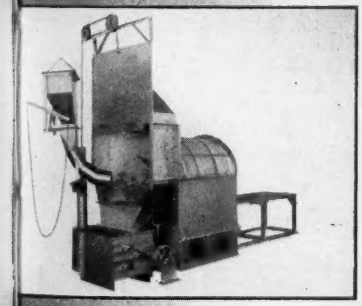
Hexagon Netting Machine



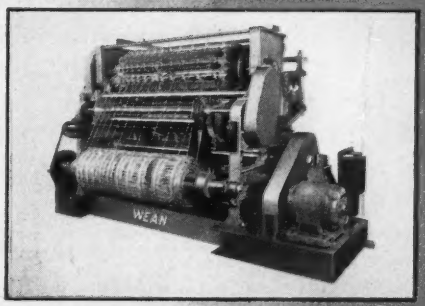
Wire Galvanizing Take-Up Frame



2 or 4—Point Barbed Wire Machine



Nail Galvanizing Unit



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Wean Equipment Corporation

CLEVELAND, OHIO

COATING METAL USED IN HOT-DIP GALVANIZING

by Wallace G. Imhoff, President
The Wallace G. Imhoff Co.,
North Highlands, California

Part I

This article is the first of a series of four that will be devoted to the subject of hot dip galvanizing. This first paper is on zinc, the body of the bath. Following this the three other papers will discuss respectively: impurities found in zinc slab and the galvanizing bath; metal and alloy additions to the galvanizing bath and coating qualities resulting from different galvanizing bath compositions.

ZINC

No better title could be selected for this series of four articles, than that chosen by **Camp** and **Francis.** This material, too, like theirs will not confine itself to metal for wire galvanizing alone, but will cover the subject in a general way for all fields of hot-dip galvanizing, in order to bring out many details that would have to be eliminated if the material was confined to one field of zinc coating alone.

★ ★ ★

Many things are known today about the coating metal that were not known years ago. Constant research over the years has slowly but surely disclosed what a good coating metal for hot-dip galvanizing is, what particular kinds and types of metals are used for specific purposes, what other metals are found in zinc as impurities, what metals and alloys can, and are added to the galvanizing bath to develop special finishes, and finally the role of all, in producing the commercial product that is desired, at the highest production, with the highest quality, at the lowest costs.

★ ★ ★

In a discussion of coating metals for hot-dip galvanizing the first thing is to look into the characteristics of the various kinds and types of zincs available, since the metal zinc forms the main body of all metal in the pot. The chemical composition of the different grades of zinc is shown in the table.

★ ★ ★

The metal zinc is a peculiar metal. The more that is known about it, the more interesting it becomes. One phase which is not very well known is that this metal contains small amounts of some other very rare metals, which might possibly impart to zinc some of its characteristics. Its remarkable properties may be due to traces of gallium, indium, and thallium found in rocks and rock minerals containing zinc. Gallium is found in nearly all zinc blende, indium frequently, and thallium occasionally. None of these are found in lead ores, and it is well known that molten lead does not attack and destroy the hot-dip galvanizing pot. So perhaps some of the characteristics of the metal zinc may be attributed to small amounts of these rare metals as impurities.

★ ★ ★

As a general rule the presence of these rarer elements in zinc is not known. However, galvanizers have been constantly reminded of the powerful dissolving action of molten zinc by the failure of their pots, and have probably wondered at this strange metal, which is one of the commonest and best known metals. Still it seems to possess some hidden property which "spells death and destruction", to all other metals and alloys when in contact with it, at and above galvanizing temperatures. There are plenty of actual records showing a galvanizing pot life of a few days, or a week, or a few months, which illustrates in a striking way this destructive action of molten zinc at high temperatures.

★ ★ ★

Prime Western zinc has been designated as the zinc metal for hot-dip galvanizing, but it is of great interest and of much technical value to consider many other types and kinds of zinc metal that have been put into hot-dip galvanizing pots in the past. There have been many angles and considerations that form the background and the reasons for using these other kinds of zinc for coating purposes. First there is always the metal cost, the economic angle; other reasons may be found in a near-by source of metal supply; a special feature desired in the coating finish; return of reclaimed zinc from by-products; etc. Years ago not too much was known about the

TABLE I

Chemical Composition of Different Grades of Zinc

GRADE	COMPOSITION, MAXIMUM PER CENT OF Pb	Fe	Cd	Pb+Fe+Cd
Special High Grade	0.010	0.005	0.005	0.01
High Grade	0.07	0.03	0.07	0.10
Intermediate	0.20	0.03	0.50	0.50
Brass Special	0.60	0.03	0.50	1.00
Prime Western	1.60	0.08	....	....

technical phases of the galvanizing process itself, and therefore there was a wider variation of metal used. In many instances the poor grade of zinc used, caused excessively high galvanizing costs.

★ ★ ★

It is important to recognize at once at least two broad phases of zinc metal for galvanizing. First and always is costs; not only the actual cost of the slab zinc itself, but overall costs when using the type, or brand of metal put into the pot. The second important phase is the characteristics, or the quality of the metal in the slab form, in the pot as galvanizing bath, and as it affects galvanizing operations, and finally the characteristics of the metal as coating. Apart from these considerations, there is the additional consideration of the amount of by-products formed, and the action of the metal as molten zinc on the pot itself. The demands differ in different fields of hot-dip galvanizing, and in addition to these special demands, many commercial angles enter the picture from the use standpoint. Thus even in a general discussion of coating metal for hot-dip galvanizing, the subject slowly and gradually divides itself into the kinds, grades, and types of zinc available, and the special characteristics demanded as specifications for definite practical applications of the product. We can not discuss in detail either of these general considerations, but extremely valuable technical information is made available by revealing the differences in metals used and results obtained. It is with this idea in mind that the various types and kinds of zincs will be discussed. Much more information can be given by covering all fields of galvanizing, than to confining the remarks to the wire galvanizing field alone.

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In order to reveal the various qualities and characteristics in all kinds of zinc that are used today, and have been used in the past for hot-dip galvanizing, a few brief comments about each kind of metal will be given. This method will clearly illustrate the various points of importance that should always be kept in mind when purchasing coating metal for hot-dip galvanizing.

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1. Supply is often even more serious a problem than cost; there are numerous examples on record where galvanizing baths have been operated far below the safe working level because no fresh zinc could be obtained at any price. During the war and immediately following, pots were operated without any visible supply at all, and the pot was kept going by sending a truck over to the nearby smelter and getting only ten to fifteen slabs of metal at a time. Thus emergencies have actually created the condition that supply is of even more importance than price.

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2. Cost is perhaps then the second factor of importance. The standard zinc metal for hot-dip galvanizing is the grade known as "Prime Western", but this grade, and this quality of metal has been questioned many times from the standpoint of operating conditions, by-products made, and overall costs resulting from many different angles and reasons when using this grade of zinc. Buying policies are extremely important since one policy may be based on first cost of the slab zinc alone, while another policy may be to purchase metal based on overall costs resulting from all operating conditions, metal per ton of product, by-products made, quality of the coating, and every other angle involved in the normal hot-dip galvanizing practice. It would appear that the second policy of weighing costs is a better policy than considering just the actual purchase price of the zinc metal. Cheap metal has many, many times proven to be extremely costly in the overall picture of galvanizing costs.

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3. Uniformity of metal is a basic factor of importance. Metal when purchased must not vary widely in chemical composition. In order to standardize galvanizing practice the metal put in the pot must be reliable and dependable. Nothing can create more trouble and turmoil than to get one kind of zinc one time, and metal of a very different chemical composition at another time. Not all hot-dip galvanizers know the role of each of the many impurities that may be found in slab zincs, and it has happened over and over again, that much trouble, serious operating conditions, and irregular galvanizing practice, together with a poor quality product, and high costs, may be directly caused by some irregularity, variation, or lack of uniformity in the coating metal purchased. The metal must be uniform, and its chemical composition dependable to set up a good galvanizing practice.

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4. That means that the zinc purchased must continually conform to the specification of the grade asked for. When business conditions are normal, competition will force this standard of metal quality, but during war time, and in abnormal times of scarcity, and controls of one kind or another, sometimes there is not only a wide variation in chemical composition, but also a serious deterioration in the actual quality of the metal.

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5. Good smelting practice is extremely important. During war time conditions with acute scarcity of metal, sometimes the quality of the metal suffers greatly. Some very important elements may be taken out, or some excessive impurities may be in; high production in the smelter may affect the quality of the zinc; temperatures may not be as accurately controlled, and the operating conditions may be below standard, all affecting the quality of the coating metal.

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6. Oxide, scruf, and dirt in the metal are very important considerations. Very high quality zincs will carry around one half of one per cent of oxides, scruf, and dirt; very poor metals have been found to carry up to two per cent of oxides, scruf and dirt. This makes considerable difference in the cost of the coating metal, because a coating metal of high quality usually has little scruf in it, and vice versa, a metal high in scruf and dirt and oxides, is generally of low quality.

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7. The question of impurities in zinc is extremely important, because the role and the value of all the impurities are not fully under-

stood. Due to this fact, this question has at times become a source of lively debate and argument. The facts are best illustrated by examples which will be given at the proper time.

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8. The question of whether the coating metal comes directly from smelted virgin ore, or is made from by-products and other materials is also of paramount importance. Years ago when zinc was plentiful, and galvanizing was done on a small scale, a large part of the zinc supply came from smelted virgin zinc ore. During and after World War I however, when galvanizing operations were carried on, on a much larger scale thereby producing thousands of tons of dross and other by-products, many small dealers went into the zinc smelting business, and later on, large corporations combined zinc smelting operations in their companies just the same as they had already combined coal mining and ore mining operations. Gradually there emerged two general classes of metal, namely that smelted directly from virgin zinc ores, and that smelted from by-products and other zinc containing materials. There can be considerable difference in the quality of the coating metal from each one of these sources, and it is of importance to know and understand the basic causes of the difference between the two kinds of zinc.

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A slight background has just been given which has somewhat of an economic slant on the various angles touched upon. Years ago the hot-dip galvanizer found himself many times in trouble that was very costly to get out of from an operating standpoint. There were accepted practices that appeared to make a saving on the surface, but which under the scientific study of later years, were found to be not only wrong, but extremely costly from all angles.

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Before commenting on the different kinds of zincs and coating metals used in the hot-dip galvanizing bath, it is important to know and understand the role that the various components play in the three phases of this process, which are the slab zinc, or cold metal that is put into the pot; the molten bath in the pot, and the zinc coating on the product. Attention too, is called to the fact that different grades of zinc are used in different fields of galvanizing, and that the different metals and alloys added to the bath, as well as the different impurities in the slab zinc, are beneficial in some baths and very harmful in others, the use of the finished product, and the service of the zinc coating determining what conditions are beneficial and what are harmful. A detailed discussion regarding the impurities and these different phases will be given later; at this time only a few remarks will be made in order to bring out more clearly the characteristics of the different grades and kinds of coating metal, and the practical results obtained in using them.

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(a) The role of iron in the galvanizing is so well known that not much need to be said about it, other than that it is harmful, and causes much trouble in large amounts. It was brought out in a recent paper by the writer presented at the World Galvanizing Conference held in Copenhagen, Denmark, July 1950, that the very basis of hot-dip galvanizing is the formation of the zinc-iron alloy, and that it is impossible to zinc coat without the formation of the zinc-iron-alloy and some iron going into the galvanizing bath to form dross.

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(b) Lead is an impurity in zinc and is usually found associated as lead ores with the zinc ores. The role of the metal lead in hot-dip galvanizing baths has been kept in a state of confusion and misunderstanding because in war times the grade "Prime Western" zinc can be coating metal that contains up to 1.60 per cent lead, or it can be coating metal that does not contain any lead. Thus when the price of lead is higher than that of zinc, and lead is scarce, it is advantageous to take the lead out and sell it separately. This is done without changing the grade, "Prime Western", or changing the price of the zinc with little or no lead in it. But this works to a very distinct disadvantage to the galvanizer by creating much higher dross, greatly increasing his metal per ton of product, increasing the quantity of the by-products formed, and decreasing the production and the quality of the product. Attention is called to the fact that in the early days of hot-dip galvanizing when most slab zinc came from the virgin ore, that practically all zinc except the higher grades, contained from 0.75 to 1.00 per cent of lead; many carried up to 1.25 per cent, and the upper limit of 1.60% of lead was set because there was a time when the price of lead was much lower than that of zinc, that it was advantageous to put as much lead in the zinc as possible so that the lead would sell at the zinc price. About 1.00 per cent of lead is very beneficial to the galvanizing bath.

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Attention is once again called to the fact that this discussion is not confined to the wire galvanizing field in order to bring out all of the important points that should be known and understood about coating metals for hot-dip galvanizing. The variations of practice in bath characteristics are important for the kind of product being galvanized, and in the field of galvanizing, the purpose, or use to which the product will be put largely determining the kind of coating being applied. The sole purpose of some coatings is for corrosion and rust protection, while others must thin, and capable of being bent and formed without peeling and flaking off as a result of fabricating operations. Thus when we discuss a coating metal we must always think of the purpose of the coating, and the use to which the finished product will be put. Service and use of the galvanized product play a very vital part in determining the characteristics of both the slab zinc put into the pot, and the chemical composition of the molten galvanizing bath. Zincs have been graded for that very reason, and while the grade "Prime Western" has been designated as the standard grade of zinc for hot-dip galvanizing, still there is no reason whatsoever why a better grade of metal cannot be used if it is found

that the metal purchased as "Prime Western" is not satisfactory, or is causing operating trouble. This point will be clearly brought out in a brief discussion of the different grades and kinds of coating metal.

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Prime Western Zinc:

The American Society of Testing Materials has set the Standard Specifications for Slab Zinc (Spelter) and it has the title, A.S.T.M. Designation: B—37. In the "Scope" of these specifications it is stated—

"1. These specifications cover slab zinc (spelter) made from ore or other material by a process of distillation or by electrolysis, and not produced by 'sweating' or remelting of secondary zinc, in six grades as follows:
(1a) Special High Grade
(1) High Grade
(2) Intermediate
(3) Brass Special
(4) Selected
(5) Prime Western

It will be noted that (4) Selected grade, was not given in TABLE 1. This grade has a chemical analysis as follows:—Lead 0.80; Iron 0.04; Cadmium 0.75; Aluminum None; and the sum of lead, iron, and cadmium 1.25. This grade may not be available under present war conditions because of the high cadmium content, which is a scare metal at such periods of emergency.

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Since the grade "Prime Western" is the standard grade of coating metal used by the galvanizing industry as a whole, it is the best starting place for a discussion of all coating metals. As stated before years ago practically all "Prime Western" grade of zinc was made from virgin ores, and hence carried anywhere from 0.75 to 1.25 per cent lead content, with an average around 1.00 per cent. Since little or no trouble could be traced to the lead content of the zinc, and also since little or nothing was known about the role that the metal lead played in hot-dip galvanizing operations, under routine operating conditions it was accepted and forgotten. During and after World War I a very gradual change took place in which the "Prime Western" zinc made from virgin ores still continued as usual, but the enormous quantities of by-products from many galvanizing plants during the war started the production of zinc also meeting the Prime Western Specifications, but made largely using these by-products as a base for the metal zinc. At first small smelters began to appear, but when the field became large enough the large steel corporations built their own smelters, and went into the zinc smelting business. Those who are trained technically know that there is considerable difference sometimes in the quality of a Prime Western slab zinc made from Virgin Ore, and a Prime Western slab zinc made from by-products of the galvanizing industry. Since dross contains practically no lead, and since the other by-products do not contain lead in any appreciable amounts, the first noticed is that this secondary zinc may not carry any appreciable amount of lead. One grade of metal of this type carries from 0.05 to 0.15 of lead by chemical analysis; generally it is near the low value. But according to the specification, since the A.S.T.M. has never set a lower limit of lead for Prime Western slab zinc for galvanizing, this secondary zinc is also "Prime Western" slab zinc.

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It is not the purpose at this time to discuss the details of the role that lead plays in zinc, and in hot-dip galvanizing baths. By briefly commenting on what happens in the ordinary galvanizing plant when coating metal without lead in it is used, we can illustrate the value of lead in galvanizing baths. Lead lubricates zinc and makes it flow easier; it makes zinc malleable and somewhat ductile; it gives fluidity to the galvanizing bath; and it directly affects the formation of dross, and the metal per ton of product. Both of these factors are vital items in galvanizing costs. It is pertinent to ask why it is that some galvanizers can continually use coating metal without lead in it, while others find their dross production is extremely high, far above normal; their metal per ton of product is almost double what it should be; and the life of the galvanizing pot and general operating conditions have greatly deteriorated. The answer is to be found in the kind of products galvanized; or in different language, the amount of molten bath removed in a given time from the pot. Large surface area takes out the zinc before it has a chance or the time to become highly contaminated with iron. On the other hand, heavy work, and little surface area will only remove a small amount of metal in a given time, hence the bath becomes heavily saturated with iron; dross is very heavy, and the iron saturated zinc bath not only greatly increases the metal per ton of product from the iron in the zinc, but also because the metal freezes quicker and more metal stays on the goods.

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Pure Zinc; Electrolytic Zinc:

"Prime Western" grade slab zinc is (5); Pure Zinc, and Electrolytic Zinc are therefore at the other end in so far as quality of zinc is concerned; they are the highest quality; the best metal. This grade of metal focuses attention on the fact that certain kinds of metals are used for definite reasons; in this case, the reason is that pure zinc corrodes the least. Thus extremely exacting products, such as telegraph wire, and some other kinds of products specify that pure zinc must be used because of the corrosion resistance factor. But the fact of special demands for corrosion, does not alter or change the hot-dip galvanizing conditions.

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Some years ago a hot-dip galvanizer complained that his pots, which usually had lasted at least two years or more, were now failing in less than six months time. His dross was very high, and he was using excessive metal per ton of product. He had been sold on the idea that "the purer the zinc, the less dross, the longer the pot life, and the lighter the coating, and the better the operating conditions". To his great dismay he now was finding exactly the opposite was true. Here is the reason—the combination of pure zinc and iron contamination gives a thick sluggish bath that is a high dross producer. This requires more heat to the pot, and if the dross is not kept out of the pot, that means a short pot life. In addition to this fact, while the zinc may have been pure at the start, under heat it quickly becomes contaminated with iron, and this increases the metal used per ton of product from two

angles; one, the metal itself is heavier when carrying a high iron content; and second, the metal deposited is very much heavier because the metal is so thick that it freezes quickly, the run off time is shorter, and the metal left on the surface is much greater. Here we have the paradox—a poor grade of "Prime Western" zinc without lead in it will cause heavy dross production, high metal per ton of product, and short pot life, and exactly the same thing happens with too pure a coating metal. It has been said that these pure metal baths can only be used a short time, and then they are dipped out, slabbed, and transferred to a pipe or sheet galvanizing department.

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We will very briefly comment on all of the various kinds, grades, and types of metals that have been used for coating metals in hot-dip galvanizing plants in the past, and at present.

(1a) Special High Grade Zinc:

Price is the all important factor involved here. If the galvanizing bath already carries from .75 to 1.00 per cent of lead, this metal could be used in very small amounts to lower the iron content, and increase the fluidity of the bath, thereby lightening the coating, and using less metal per ton of product. Only a small amount of the metal can be used because it carries no lead, and exactly the opposite results would be obtained if large quantities of it were used, since the lead content of the bath would gradually be reduced with no lead coming into the bath in the slab zinc charged. By adding pig lead from time to time, and keeping a close check on the lead content of the bath by routine analysis, this grade of metal could be used in larger quantities. The balance between first cost of zinc, and the dross produced, metal per ton of product, and operating conditions, would have to be determined, plus the added cost of adding pig lead to hold the lead in the bath between 0.75 and 1.00 per cent. It might be cheaper in the end to add enough pig lead, and balance off the increased costs with less dross, lower metal per ton of product, longer pot life, better operating conditions, increased production, higher quality finish etc.

(1) High Grade Zinc:

This zinc is also a very pure grade of metal, and first cost is one of the factors determining its use, as well as its low lead content. Pig lead would have to be purchased and added to the bath, if very much of this metal was charged into the pot.

(2) Intermediate Zinc:

It will be noted that this grade of zinc carries 0.50 per cent cadmium. Cadmium imparts a very beautiful finish to hand-dipped ware; it also imparts a special frosted spangle in sheet galvanizing, so that when this particular finish and spangle is desired, additions of this high cadmium slab zinc will produce it. It also has the advantage, as do the others, of reducing dross production, since the iron content is very low. This metal also will thin the bath and deposit less zinc per ton of product. The extra cost has to be weighed with the advantages obtained from using it.

(3) Brass Special:

A few plants use this grade of metal in preference to Prime Western Grade because it reduces the dross, gives lower metal per ton of product, and gives much better overall operating conditions. However, when Brass Special grade is used, pig lead has to be purchased and put into the pot to raise the lead content up high enough to produce the best operating conditions, and give the smooth finish desired.

(4) Selected Zinc:

This grade is higher in both lead and cadmium, and when used is generally selected for its high cadmium content which gives a very desirable finish to the coating. It is not used for the full metal charge, but just in the proportion that will give the desired finish. It is very low in iron content so tends to reduce the dross, and balance off the increase in the cost of the metal, with the operating results that reduce overall galvanizing costs. Its low iron and cadmium and lead content tend to lower the metal per ton of product too.

(5) Prime Western Zinc:

This metal has already been discussed briefly. A lower lead content of 0.75 to 1.25 per cent should be set in the specification for this metal.

Secondary Distilled Zinc:

The claim for this zinc is that it is very pure zinc. But we have already illustrated that only in certain cases where the specifications require it, is pure zinc very desirable. By the A.S.T.M. specification which sets only the upper limit for lead in zinc, it is possible to produce a "Prime Western" zinc without any lead at all, and it will still be a "Prime Western" grade, since no lower limit for lead has ever been set for this grade of zinc. Where the product coated is a large surface area, little trouble may be encountered without lead, but with a small surface area, and especially with poor combustion and heat application, metal without lead will quickly cause operating trouble.

Remelt Zinc:

Remelt zinc has been used in the past in many plants. When the remelting practice is good, and when the chemical composition held fairly constant, this metal has proven that it can be successfully used. In most instances however, the impurities have been allowed to rise beyond the allowable limits, and the composition has become so unreliable, and unpredictable, that such metal had to be discontinued due to the operating troubles encountered.

Sweated Zinc:

Years ago many galvanizers sweated their dross, and got out what they thought was good zinc to put back into their pots. Scientific studies however revealed that this overheated reclaimed zinc was very high in scruf and oxides, in addition to carrying from 1.50 to 2.00 per cent of iron. Many instances were found and are on record where putting this sweated zinc back into the pot increased dross production enormously, helped to shorten pot life, and greatly increased the metal per ton of product due to the metal

(*Please turn to page* 420)

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*Described in a recent issue of Industrial Marketing.

Wire As a Material for Product Fabrication

by Paul F. Titchener, President
E. H. Titchener and Company
Binghamton, N. Y.

In this article, the author has set forth facts on wire and its fabrication into wire products in such manner that it will be of interest to those concerned with the design or production of wire parts or products.

Wire, as a form of basic material for metal products, is of great importance in American industry today. A coil of wire, according to the size, may contain from 50 to 250 pounds, and from 100 lineal feet to 8,000 feet. Where can we find a more convenient form of raw material for large-scale production of metal parts?

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Although steel wire in coils represents the bulk of wire used, a wire products manufacturer must also be ready to use, and must be informed on the adaptability of, many non-ferrous wires, such as copper, brass, bronze, Monel, Copperweld and stainless steel.

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The use of wire as a substitute for other forms of materials in the manufacture of metal products is becoming increasingly popular. Many manufacturers have found that a piece of wire, formed in a particular shape, or combined with one or more strip metal parts by a welding or an assembling operation, can accomplish the same desired result that a more expensive metal construction formerly accomplished. Moreover, wire is often readily obtainable when other materials may be in short supply.

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The automatic or the semi-automatic wire former is capable of bending wire into unlimited shapes or contortions. In most cases the processes accomplish all of the necessary requirements previously achieved with expensive machined angles and curves.

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By far the least costly of all wire forms are those which can be made in a single operation, at high speed, on automatic forming equipment known as Four-Slide machines. A feeding mechanism pulls the wire through a series of straightening rollers and the wire is cut off automatically to the proper length for the piece to be formed. At the same instant it is wrapped round a central core or center die by the motions of four sliding blocks equipped with dies. By varying the shape of the central core and the dies attached to the sliding blocks, various shapes can be achieved. Such items as wire handles, coat hanger hooks, loops, rings, etc. are made in this manner. All of these articles generally lie in a flat plane since they have been formed around a fixed center die by the four sliding dies. Accurate set-up is essential to precision work. Aligning and adjusting a die in an automatic machine requires highly specialized and skilled workers.

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Some of the four-slide machines have an up-and-down motion called a vertical former, which bends certain parts in another plane. There are limits to the number of bends which can be added in the vertical plane. However, by the use of ingenious tooling, much can be accomplished by using four horizontal motions and one vertical motion. Limitations in the products which can be formed on automatic forming machines are as follows:

Wire Diameters from 1/16 of an inch up to and including 5/16 of an inch can be formed on automatic machinery.
Maximum length of wire which can be formed in a single automatic operation is approximately 21″.

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Wire should preferably be round, although half oval or flattened wire may also be formed in the same manner. Some machines are equipped with separate press attachments which will form swaged areas, flat or extruded ears, etc.

Types of Steel Wire Used in Forming Operations

Round Basic Steel Wire: This is the description attached to most of the round steel wire which is used in general wire product manufacturing. Sometimes this wire is called "Nail Wire", sometimes "Bright Market Wire" and in other cases is called "Plain Wire".

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Extra Clean, Extra Bright Wire: This is the ordinary bright basic wire, special drawn for a quality finish. The surface of this wire is supposed to be free from scratches and compounds, is furnished with an extra clean and a special bright finish. This quality of wire is needed for production of wire products to be plated; it is also needed for reliable and fast production of electric welded assemblies. It is produced by mills with special drawing and lubrication in order to obtain the smoothest and brightest possible surface.

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Annealed-in-Process Wire: This is dry drawn and annealed at an intermediate stage between rod size and finished size, in order to produce a softer wire of fairly uniform temper. It is important to use this grade where bright wire would be too stiff or too hard for a given forming operation.

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Galvanized Steel Wire: This is a regular commercial mill product and represents a material that can be counted on for rust protection for a reasonable period of time. Very large quantities of wire products and assemblies are made of this

grade of galvanized wire. Galvanized wire is zinc coated and made by passing single strands of bright wire through molten zinc. This is made in various tempers depending on the application.

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Bethanized Wire: This is a special grade of galvanized or zinc plated wire. It is coated by electro plating from zinc concentrates. It is available in brighter finishes than ordinary galvanized wire. Has added quality which provides a better non-rusting and non-corrosive protection. This material is made in several grades in accordance with the quality of finish needed. Some of the more expensive grades of Bethanized wire are used where superior non-rusting and non-corrosive characteristics are important.

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Coppered Wire: This is a regular mill product and is suitable for making many wire products where a bright attractive finish is desirable, but where cost consideration will not permit using a special plated finish. Coppered wire is produced by wet drawing wire with a copper sulphate or copper-tin sulphate solution. The color of this wire varies in accordance with the chemicals used. The drawing operation imparts a luster to the wire that is useful in improved appearance and a limited amount of corrosion resistance.

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Tinned Wire: This also is a material used for products that require a special bright, attractive finish, where costs do not permit a special plated after making. Tinned wire is bright wire coated with tin by passing through a bath of molten tin.

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Cadmium-Plated Wire: Steel wire with cadmium-plated finish is available in peace times. This coating provides an excellent rust-proof coating.

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Spring Steel Wire: This is wire of the proper chemistry to impart added tensile strength and added stiffness over basic low-carbon wire. In general, the types commonly used in the wire forms business are as follows:

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MB Spring Wire-Hard Drawn—a medium carbon (0.45/0.70 carbon) basic steel wire drawn without annealing and used for ordinary springs and for wire forms where stiffness greater than imparted by low-carbon wire is required.

Upholstery or Bed Spring Wire—a slightly lower-priced spring wire of characteristics similar to MB wire but not held as closely to chemical specifications.

Annealed MB Wire—MB wire spheroidized annealed at finished size and intended for production of parts to be heat-treated subsequent to manufacture.

Music Wire—spring wire of higher chemistry and made to closer tensile ranges and higher finish specifications than MB wire.

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Stainless Steel: Practically all types of stainless steel wire are available in coiled wire. Selection of stainless steel type is optional to customers in accordance with the rust and corrosion resistance required.

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Monel Metal Wire: Various grades of Monel Metal are also available in all gauges of coiled steel wire.

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Non-Ferrous Metals: Coiled wire is available in all non-ferrous metals. Wire formings and assemblies are made in quantities from the following: aluminum, bare copper, brass, bronze, and nickel silver.

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Copperweld: This material is used extensively in coiled wire. This is applicable to products which require a superlative non-rusting and non-corrosive finish, and where an improved electrical conductivity is needed. This wire is mainly steel. It has a copper armor which is drawn with the steel wire and which approximates 10% of the diameter.

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Welding Wire Assemblies

Regarding methods of attaching wires together, or attaching wire to strip parts, the most efficient operation is electric spot welding. Carbon steel wire and certain types of stainless steel wire are very well adapted to this type of welding. Small wires may be satisfactorily welded to larger diameter wires and wires of equal diameter may be joined. It is often necessary to weld two ends of wire together in a butt welding operation to complete such items as closed rings, frames, etc. In this operation there is a slight surplus of metal which projects beyond the regular surface of the wire as a result of the weld. This surplus or "flash" can either be removed or swaged smooth, in an extra operation, if its presence is objectionable (See Fig. 1)

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A straight piece of wire may be T-welded into the side of another piece of round wire successfully by the development of special holding fixtures. This is a common operation on such items as refrigerator shelving, wire grills and other similar assemblies. (See Fig. 1)

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In designing wire products which are to be welded, it is preferable that the welds occur where two wires cross each other at right angles, or nearly so. This is generally known as cross-wire welding. It is not good practice to weld two wires lying parallel to one another.

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In joining strip material to wire, a much better concentration of the welding current is obtained by swaging a small welding projection in either the wire or in the strip steel part, or in both. Whereas, if wire is laid flat on the surface of a strip part, the current has a tendency to become dispersed over a larger area, thus making an uncertain weld and causing slower production

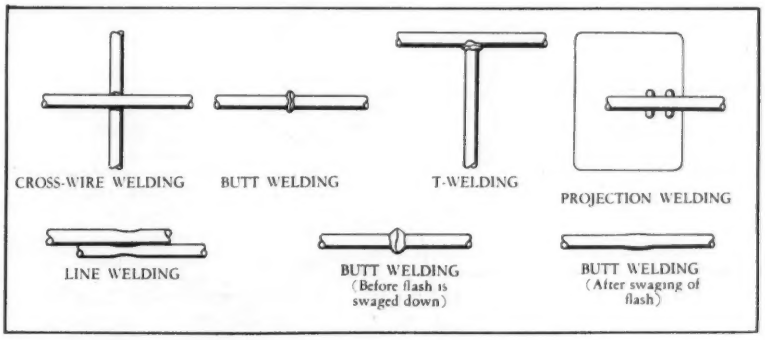

Fig. 1—Types of Welds

speeds. (See illustration of projection welding, Fig. 1)

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A great deal of progress has been made in recent years in developing welding techniques which provide for multiple welds to speed production. Such items as flat shelving are well adapted to the multiple welding method.

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There are some limitations regarding the finishes of wire that can be used in welded assemblies. Such wires as galvanized, copper coated, tinned, nickel plated and other specially coated wires can be welded successfully. However, there is the slight objection in that the coating will be burned during the welding. This leaves a slight discoloration on the wire at the point of weld.

Strip Metal Parts

Strip metal parts can be formed in a similar manner, by using a 4-slide automatic machine known as the "Multi-Slide". This machine ha a feeding mechanism and straightening rollers. However, in addition to the four slides, there are separate cams and fixtures to accommodate special pre-forming operations, such as indentations, cutouts, holes, etc. Using this type of equipment, complicated strip steel parts can be formed. We make use of the large-size Multi-Slide Number 33, which will accommodate strip of the following limitations:

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The width of the strip can be as much as 2″, and the length of the piece to be cut and formed can be 14″ long. The thickness may vary from 0.10 of an inch, to 1/16 of an inch. Strip of any metal may be used, including steel, brass, aluminum, copper, stainless steel, etc.

★ ★ ★

Standard punch presses, fed either manually or automatically are also used in the making of strip steel products.

Hand Forming—Semi-Automatic Forming

Turning to forms which require a length of material longer than can be accommodated in automatic machines, it is here that the ingenuity of the wire forming company comes into its own. Special bending devices are utilized; some manually operated, others mechanically driven. Often power presses are utilized for severe bends. Wire must be straightened and cut to the proper length. Then, through a series of hand-fed operations, it is formed into the desired shape. When special treatment of the wire ends is called for, it is possible for the wire products manufacturer to furnish milled ends, threaded ends, pointed ends, sheared cut ends, etc. (See Fig. 2). These are accomplished by the use of special machines, milling heads and other special tools.

Tooling

Tooling for production of wire products, compared to the tooling for other manufactured items, is moderate in cost. Furthermore, good tools, jigs and fixtures for wire goods production, can always be developed in a relatively short time. In making these statements we are comparing wire products tooling to the big investments that are generally required for castings, forgings, molded plastics, large stampings, etc.

Plating and Finishing

Wire products may be finished by plating, painting or lacquering. Among the plated finishes, the following are the most popular: nickel, chromium, cadmium and zinc.

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A great deal of progress has been made in the past few years in the development of a bright zinc plate. Brilliance is achieved by the use of special chromate dips. These chromates have a tendency to polish the zinc, bringing out a high lustre. They also seal the pores of the zinc in such a way that improved corrosion resistance is achieved. The chromate film is rather thin, however, and relatively soft, making it vulnerable to abrasion. For this reason it is advisable, when allowable from a cost standpoint, to add a baked lacquer to preserve the chromate film. This operation provides an attractive and lasting finish even under severe conditions of moisture.

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The particular zinc chromate plating used by us is known as Lustre Zinc*. It closely resembles chromium, yet costs less than copper-nickel-chrome. It is especially well adapted to metal products used by refrigeration companies and kitchen cabinet manufacturers — such as wire shelves, wire trays, baskets, etc. Also, fan manufacturers and other appliance makers are finding this plating ideal for their wire guards and other parts. It should be noted, however, that this type of finish is not too durable when used near heat. A temperature of 300 degrees will turn the finish brown. Therefore, it is not well adapted to items such as heater guards, oven racks, etc.

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Cadmium plating is used to provide a good corrosion resistant surface, but it is not quite as brilliant in appearance as zinc chromate plating.

★ ★ ★

Wire products may be plated with bright nickel. This is often followed by a chromium flash, that will produce a brilliant surface without the necessary buffing which accompanies the plating of castings or forgings. In such welded wire assemblies as refrigerator shelves where chromium plating is used, a

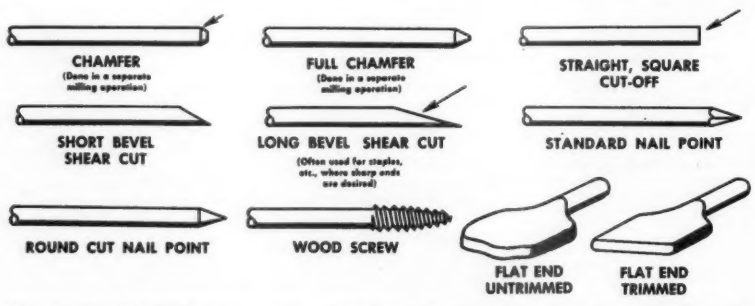

Fig. 2—Wire End Treatments

*Trade name registered, U. S. Pat. Office.

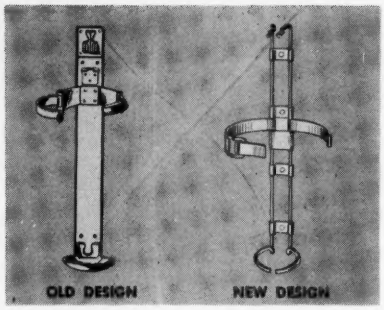

Fig. 3—Re-Designed Assembly

further improvement is accomplished by adding a baked lacquer coating to protect the finish.

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For small parts the barrel plating method is used. This process is limited to products which are simple in formation; otherwise they will become deformed by the tumbling operation. If tangling is likely to occur, the parts must be tank

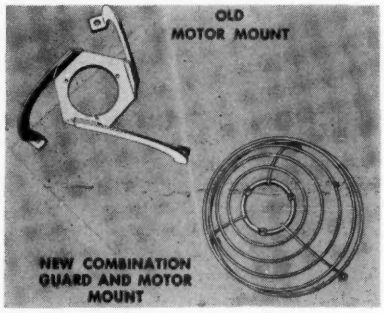

Fig. 4—Lightweight, 1-piece Fan

plated, using racks which hold the pieces individually.

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In addition to plating, wire products may be painted by dip or spray methods, followed by either an air dry or a bake operation.

Substitution of Wire Parts

Frequently certain metal products can be profitably redesigned to make use of wire formings or combinations of wire-and-strip metal.

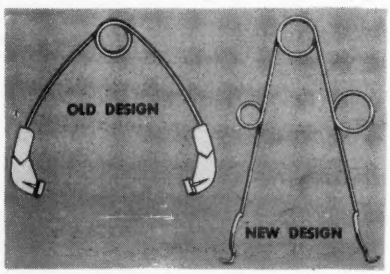

Fig. 5—Simple Wire Design

Costs may thus be reduced, yet the new parts have the same utility. In many cases the item is enhanced in appearance. Here are a few examples: A heavy casting was used as a grille for an outdoor broiler. A welded wire assembly was developed which cost less, was more attractive, and was actually stronger than the bulky casting. Most people are familiar with the wire-and-strip metal handles used on certain glass cooking utensils. These were originally designed to resemble the old-fashioned frying pan handle, even to the black finish. This is a perfect example of an adaptation of wire-and-strip-material to replace other types of construction. Later they were revised so that they were more attractive in appearance, using stainless steel, and still later polished aluminum was used. A current development is in the field of baby strollers. Many manufacturers are using an ingenious welded-wire luggage carrier. The sheet metal foot rest has been replaced with a welded-wire assembly on several leading models. Some examples of the substitution of wire for other materials are shown in Figs. 3 to 5.

Wire Flattening

Wire may be successfully flattened to make several types of products. It is usually less expensive than round edge cold rolled strip material.

Wire Threadings
Rolled Threads

Metal is extruded (pushed out) to form the thread. Ends are not chamfered. In order to obtain the same size thread as cut threading would achieve, you must start with a smaller diameter wire (blank). For example—a 1/4″-20 thread (meaning 1/4″ outside measurement

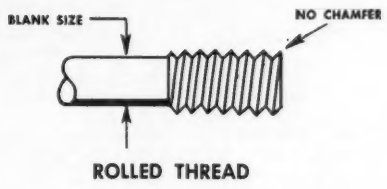

Fig. 6—Rolled Thread

of threading and 20 threads to the inch) when cut uses 1/4″ stock (.250″). When rolled, requires a .214″ blank (wire). (See Fig. 6.)

Cut Threads

Grooves are cut to form the threads.

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The advantages of this process are that the (a) Stock size equal to or larger than outside diameter of thread (b) Thread length not limited and (c) can have chamfered end.

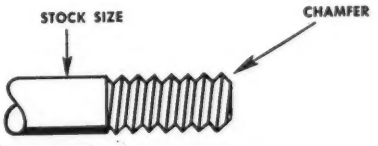

Fig. 7—Cut Thread

The advantages are that the operation is (a) less expensive, (b) faster, (c) requires no special cutting fixtures, (d) uses smaller diameter wire and (e) does not require chamfered ends for starting. (See Fig. 7.)

Forming Eyes and Ears on Wire

EYES: It is frequently necessary to develop production of wire forms with eyes on one end or on both ends. These eyes can be formed in

(*Please turn to page* 418)

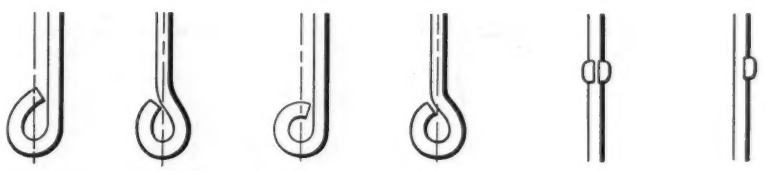

Fig. 8—Forming Eyes and Ears

YE COLONIAL WYAR TRADE

The manner of establishing a wire mill and difficulties attendant upon such an enterprise in the colonial days are interestingly set forth in the petition presented to the governing authorities on behalf of one Joseph Jencks, Sr., through which he hoped to establish a wire drawing business at Lynn, Massachusetts, in 1667.

★ ★ ★

While the petition failed in its objective, the language, the tone and the gap apparently existing between the status of those in authority and a mere artisan, are indicative of the vast changes that have occurred in wire drawing techniques and financing in the short space of three centuries.

The petition and rulings reproduced herewith were secured for us by Mr. J. Sanger Attwill, President of the First Iron Works Association of Saugus, Massachusetts, and Professor E. Neal Hartley of the Massachusetts Institute of Technology, historian for the Association, from the records of Massachusetts.

★ ★ ★

Another petition submitted on behalf of Nathaniel Robbinson, copy of which is not available, resulted also in a turn-down, worded as follows:

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A fifth document is a court order for the purchase of existing instruments and tools for drawing wire, the business probably to be operated as a state enterprise, as no wire men are named:

To ye Honoured Generall Court: the Governor; ye Deputy Governor; and assistants with the Deputyes et al now Assembled at Boston

The humble petition of Joseph Jencks Senior of Lyn humbly sheweth that yor poore petitioner as hee is sensible of his owne wants and needs soe hee is alsoe in some measure sensible of ye want of ye Countrey in generall, and at this present more espetially in this difficult juncture of tyme as of diverse other necessary things soe alsoe in particular of wyar; both for ye making cards which are exceeding much wanting at this day to ye help of ye Countrey in spinning to make cloth of any sort of wool as alsoe for making hooks for the supply and furtherance of ye trade of fishing and all other trades yt hath any dependance on or necessity of wyar for its Compleatment and well carrying on end. And yor poore petitionr though stricken in age and exercised with infirmityes of age & yett finding himselfe more capable in respect of a convenient place in respect of water for ye easyer effecting of ye worke with ye lesser charge both of purse & hands than any other yt doth now prsent. And is also willing to improove any talent wch ye Lord hath bestowed on him, for his honor & the good of the Countrey the remayning part of his dayes. and alsoe concludes yt be ye lords assistance he can make all sorts of wyar for ye Countreys use & benefitt & will speedily enterprize ye ef ecting thereof; if ye Court shall please to favor him & vouchsafe him their encouradgmt therein. Butt yor petitionr is not only weakened through age & some of ye infirmityes thereof but also very weake in estate & abillity to the carrying on end the designe: & therefore doth heereby declare it & doth further humbly petition this honord Court to vouchsafe their assistance yt hee may bee by them enabled to build him a convenient roome to worke about this business and alsoe to procure him a stock of coales & iron to make wyar withall: And this yor poore petitionr makes bold to prsent him humble service & readines to this worke as his desire to promote ye generall good of this Countrey while he liveth as a member thereof, which if ye honord Court shall please to accept off & vouchsafe him their assistance. Your petitionr shall with all thankfullnes accept of their loving favor & speedily peeed in ye worke, & alsoe shall ever pray:

The Comitte se not sufficient grounds to incoridge ye Country to adventure an estate on ye designe: yet finding y Petitioner desirous of fifty Pounds to enable him to ye worke we shall leave it wth ye Honored Court if they se reson so far to advance upon it 15th october 1667

John Pynchon
George Corgill

Th Deputyes doe not judge meete to advance any money upon the designe, wth reference to the consent of or honored magistrates hereto .

William Torrey, Clerk

Consented to by the magistrates

Edw. Rawson, Secret

"In ansr to the petition of Nathaniel Robbinson, wyer drawer, humbly craving the favor of this Court in asisting him to carry an end his trade, the Court sees no cause to grant his request. October 10, 1666."

"In ansr to the petition of Joseph Jencks, Sen, of Linn, humbly desiring the ffavor of this Court to advance a sume for ye encouragement of wyer drawing, etc., the Court judget it not meete to advanc any money on that designe. October 9, 1667."

"This Court being desirous to encourage all persons among us in manuall arts & trades of publicque utilitje, & being informed that there are in this town a sett of tooles for wyer drawing, & that there be some in the place that are able & skillfull in that imploy, the improouement whereof would be of great use in sundry respects, this Court doeth therefore order the Treasurer of the country to disburse out of the publique tresury such a sume of money as will be necessary for the purchase of the sajd instruments & tooles, not exceeding fiueteene pounds; and the Tresurer, wth Major Generall Leueret, are appointed & impowred to dispose of the said instruments so as may best further the ends purposed, as also to disburse forty shillings for the encouragemen of those that shall make cards and pinns of the sajd wiar." October 9, 1667.

A GOOD MEETING TO ATTEND—

THE PITTSBURGH REGIONAL MEETING

of the

WIRE ASSOCIATION

MAY 8-9, 1952, WILLIAM PENN HOTEL, PITTSBURGH, PENNSYLVANIA

Mark the dates and place on your calendar today — and make your plans to attend. An exceptionally fine program has been set up that will give you two days of profitable, interesting and entertaining activities. Try to be there.

The Program Committee

Chairman, Tom M. Girdler, Jr., Superintendent, Union Drawn Steel Div.,Republic Steel Corp. Asst. Chairman: C. R. Harmon, Carbide Sales Manager, Firth Sterling Steel and Carbide Corp. Committee Members: C. W. Garrett, Metallurgist, Aliquippa Works, Jones and Laughlin Steel Co.; Charles Williams, Wire Mill Supt., Pittsburgh Steel Company, Monessen; George Fescon, Die Room Superwisor, Pittsburgh Steel Company, Monessen; and W. E. Hill, Jr., Plant Superintendent, Russell Birdsall and Ward Bolt and Nut Co., Rock Falls, Ill, who will serve as chairman of the Technical Session.

The Program

Thursday, May 8th, 8 A.M.: Registration desk open 8 A.M. to 6 P.M., 17th floor.

10 A.M.: Meeting of the Board of Directors in Parlor G, 17th floor.

12 Noon: Board of Directors Luncheon in Allegheny Room, same floor.

1:30 P.M.: Busses leave the Hotel for a tour of the plant of the Firth-Sterling Steel and Carbide Corp. Ladies are invited to go on this trip. *Admittance to the plant granted only to those wearing badges and arriving on the chartered busses.* Please do not try to go to McKeesport in private car — you cannot be admitted.

6-7 P.M.: Cocktail party in the Pittsburgher Room through the joint courtesy of R. H. Miller and Standard Industrial Compounds Companies.

7:00 P.M.: Banquet in the Pittsburgher Room. The speaker will be Thomas Patton, Vice President and Chief Counsel of the Republic Steel Corporation. Ladies are invited to the banquet.

Friday, May 9th, 9 A.M.: Technical session in the Monangahela Room, 17th floor.

PAPER: Drawing of Aluminum Wire, by Joseph Urbinik, Plant Supt., Kaiser Aluminum Co., Newark, Ohio. Covers both standard and fine sizes.

PAPER: The History and Development of Planetary and Thread Rolling Machinery, by George Paff, D. H. Prutton Machinery Co., Cleveland, Ohio.

SYMPOSIUM: Mechanical Cleaning of Rods and Wire. William Baldridge of Laclede Steel Company will serve as moderator, with discussion panel members as follows: Floyd Hauger, Standard Industrial Compounds Co., E. T. Miller, Firth Sterling Steel and Carbide Corp., and W. H. Hill, Northwestern Steel and Wire Co. See details on page 416.

11:15 A.M.: Busses will leave the Hotel to visit the Monessen wire mill of the Pittsburgh Steel Co. Charles Williams of the company is in charge of the tour. Luncheon will be served to the visitors upon arrival through the courtesy of the Pittsburgh Steel Company.

TICKETS: A registration fee of $6.00 will be charged, that will cover tickets for the two plant visits. Tickets for the banquet will cost $6.00 and may be secured at the registration desk. Get your tickets immediately upon arrival.

Members may bring guests. We shall hope to see you there.

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

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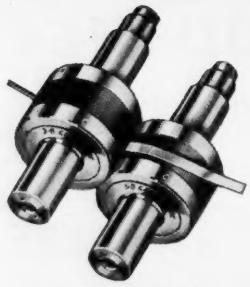

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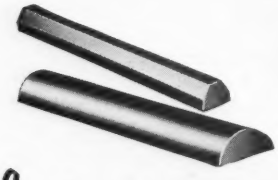

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Brush up on the latest die-finishing techniques, explained in our helpful, comprehensive, 64-page service manual, D-119. Or send your key men to our tuition-free school for 3- or 5-day courses. They'll learn the latest data on carbide-die applications, maintenance methods, die layout, and die-room operation direct from top men in the field. Write for information.

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PRODUCTION NON-FERROUS WIRE ANNEALING AT BRIDGEPORT BRASS

by W. J. Krailing, Furnace Engineer
Bridgeport Brass Company
Bridgeport, Conn.

This article presents a new idea in materials handling methods as applied to heat treating processes and shows how a leading manufacturer made most efficient use of existing facilities.

When a brass mill has only limited room for handling materials in the vertical plane, it is confronted with a very critical operating problem. Most heavy materials handling equipment is designed for transfers, using overhead cranes and similar facilities.

★ ★ ★

In taking over the wartime Navy Shell Plant at Bridgeport, Connecticut, the **Bridgeport Brass Company** found itself confronted with a fine building, but the ground floor had a working overhead space of only 12 feet. This floor was to be used for extensive non-ferrous wire and rod drawing operations, embracing all types of copper base alloys in a wide range of compositons and sizes.

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With the limited head room in this department, fork lift trucks instead of the usual overhead cranes are used to lift and transport loads to the various operations. Copper slings are utilized to lift the unit loads, and in operations such as annealing and pickling usually remain with the load being processed, thereby facilitating quicker and more efficient handling.

★ ★ ★

The same loading and handling problem was encountered when Bridgeport Brass began setting up heat treating equipment for the finish annealing of this brass wire. A rather ingenious "pan-pull" furnace is employed. This furnace, designed and built by Surface Combustion Corporation, permits loading and unloading of pans by means of the fork lift trucks used to transport the wire coils. It also eliminates the need for overhead handling of material which was well nigh impossible under the conditions existing in the converted Navy Shell Plant.

★ ★ ★

This furnace employs a perforated chrome-iron pan about 1/4 inch thick, 5-1/2 feet wide and 12 feet long, for carrying the charge of wire to be annealed. The furnace is equipped with roller rails to facilitate the moving of the pan into and out of the furnace. The perforations are about 3/8 inches in diameter and located on staggered 1-inch centers. The wire is loaded onto the pan as the pan rests on a loading table as shown to the right of Figure 1. The transfer car, which moves on rails as shown to the left in Figure 1, is then moved up opposite the loading table. The pan is drawn onto the transfer car by means of a multiple hook device mounted on a roller chain, built into the transfer car. The transfer car is then moved on its tracks for a few feet until it is opposite the annealing furnace door. This door is raised and the loaded pan of wire moved by means of a pusher head on the transfer car roller chains, from the transfer car into the furnace. Loads of approximately 8000 pounds of wire are processed in about 2-1/4 to 3 hours, depending upon the time and temperature required (Figure 2). Rods are also annealed in this same furnace.

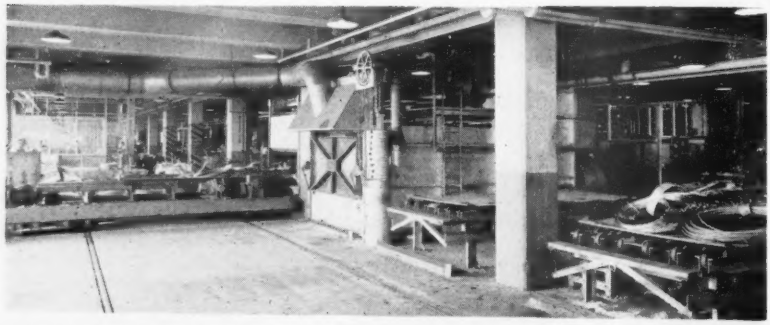


Fig. 1—Overall view of wire finish annealing installation. Pan at the extreme right is loaded with coils of wire held together by copper slings, ready for annealing. The finish annealing furnace is shown in the center and a load of wire is being transferred to the cooling chamber.

★ ★ ★

After the charge has been held for the required time at the annealing temperature, the handling process is reversed and the pan drawn from the annealing furnace onto the transfer car. The car is then moved on its tracks until it is opposite the air cooling chamber. This chamber, which is designed to provide rapid cooling of the wire down to convenient handling temperatures, is equipped with an air-operated door. The pan is moved by the transfer car mechanism onto the rails of the air cooling chamber, and the fan in the roof of the cooling chamber is started. Air is drawn from the partly opened door of the cooling chamber up through the perforated pan and through the wire—and vented through a 4-foot square hole in the roof of the cooling chamber. The heated air is carried off at this point by a duct which also serves to vent the annealing furnace. This particular air cooling chamber was developed by the Bridgeport Brass Company's Engineering Department to provide for maximum speed of cooling of the wire charges. Cooling in this chamber is further accelerated by means of water-cooled copper coils around the side walls and roof of the chamber. The cooling of the high zinc brasses must be carefully con-

trolled to prevent the precipitation of the Beta phase which makes the rods and wire hard and thus difficult to machine. A water spray is also available in this cooling chamber, but is only infrequently used, because of the pan warpage which it causes.

★ ★ ★

"Annealing", as practiced in the non-ferrous industry, is usually defined as heating above the recrystallization temperature of the alloy. "Stress-relieving" is the term applied to heating operations at temperatures just below the recrystallization temperature of the alloy. Stress relieving is usually carried out at temperatures 45 to 55°C below the recrystallization temperature to maintain a factor of safety.

★ ★ ★

Most of the wire annealing work carried out in the 'Surface' pan-pull furnace is carried out at temperatures in the range of 420 to 570°C, although the furnace is used for temperatures as low as 275°C for stress relieving and up to a maximum of 675°C for annealing.

★ ★ ★

Finish annealing specifications for brass wire are based primarily on grain size, Rockwell hardness and tensile strength. This annealing furnace has provided extremely close control of the wire by all these standards.

★ ★ ★

The uniform properties of the wire are due to the uniform temperature which is attained in the coils due to the high rate of circulation of the heated products of combustion in the convection furnace. True metal temperatures are obtainable in a convection-type furnace, and for this reason unequal size coils will respond comparably to equal crystal size specifications, provided the time cycle is sufficiently long for complete saturation of the heaviest coil. The lightest coil meanwhile will not have exceeded the desired temperature and thereby not have become softer, notwithstanding the somewhat longer time of exposure at temperature. This convection furnace has provided much more uniform heating, in its two years of service, than the direct-fired furnace formerly employed for this operation. In this Surface Combustion furnace, all of the products of combustion, after leaving the fan, must pass through the charge before returning to the fan. This positive circulation of the heated gases is implemented by the perforations in the loading pan which make possible the passing of the gases through the load rather than over it.

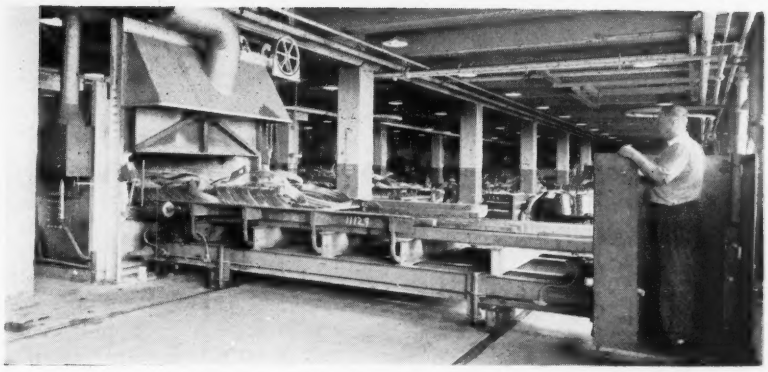


Fig. 2—Charging the annealing furnace. One operator services the entire installation using the transfer car for loading and unloading the furnace. The same man also operates the furnace.

★ ★ ★

Frequent and exact grain size measurements are made of the wire on each coil processed in the furnace and remarkably uniform grain size values are obtained. Samples are cut from each batch of wire and sections polished and examined under the microscope. The grain size is then reported as the average grain diameter in millimeters at 75 X magnification.

★ ★ ★

The furnace is essentially an oven-type unit with a Surface Combustion gas-fired air heater used to provide the heat source for annealing. A maximum temperature of 675°C is available.

★ ★ ★

The air heater is a special refractory-lined unit located at the upper rear of the furnace. It is equipped with a 'Surface' low pressure automatic proportion velocity burner and constant burning pilot. The air heater burns 530 B.T.U. carburetted water gas and has a maximum fuel consumption of approximately 3000 cubic feet per hour.

★ ★ ★

Average fuel consumption for 8000-pound net charges of brass wire annealed at temperatures of approximately 500°C is about 1500 C.F.H. The control valves on the combustion equipment are actuated by extension handles at shoulder height from the floor. This feature has eliminated the need for frequent trips by the furnace operator to the combustion equipment control platform. Automatic temperature control equipment is used to maintain uniform temperature in the furnace.

★ ★ ★

Also located at the rear of the furnace is the recirculating fan which recirculates the heated gases to and from the furnace chamber. This alloy fan has a rated capacity of approximately 14,000 C.F.M. of air through the work. The fan is driven by a 25 H.P., 1800 R.P.M. motor.

(*Continued on page* 421)

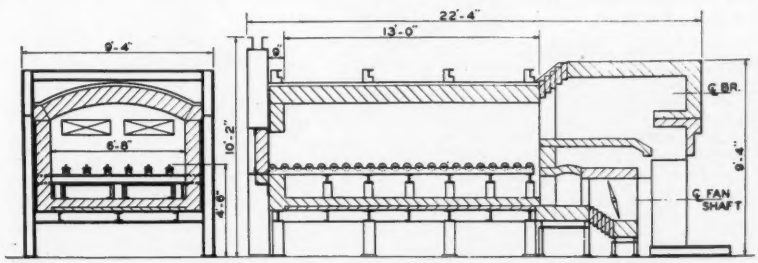


Fig. 3—Schematic drawing showing the construction of the finish annealing furnace.

Government Wire Production Information

Government to Buy Canadian Nickel

Fifty million pounds of nickel from Canadian mines will be bought by the Government over the next nine years under the terms of a contract entered into by the Defense Materials Procurement Agency with Falconbridge Nickel Mines, Ltd., Toronto, Canada, DMPA Administrator Jess Larson has announced. Purchase of up to 1,500,000 pounds of cobalt is also included in the contract.

★ ★ ★

Additional options in the contract provide for possible sale of 25,000,000 pounds of copper and an additional 25,000,000 pounds of nickel during the life of the agreement.

★ ★ ★

The Company has agreed that until the end of 1956 not less than 40 per cent of its entire production of nickel and cobalt will be offered to the American market.

★ ★ ★

The contract involves a Government advance of $6,000,000 to the Canadian firm for expansion of its production capacity. This amount will be absorbed as the Company fulfills its commitment to step up production.

★ ★ ★

Basic price to be paid for the nickel is 56.66 cents per pound, f.o.b. vessel, Kristiansand, which may be varied up or down in the event of future fluctuations in the quoted market price. Cobalt will be bought at $1.80 per pound or the current quotation, whichever is higher. Sale of electrolytic copper in cathode form, if tendered, will be at 19 cents per pound.

★ ★ ★

The Falconbridge contract is the first negotiated by DMPA to obtain vitally-needed nickel from sources outside the continental United States. However, the General Service Administration on February 6 announced that the United States-owned Nicaro nickel plant in Cuba, one of the world's largest, was back in production.

★ ★ ★

Procedure for Placing CMP Orders

A new procedure for assisting persons in placing authorized controlled materials orders with producers of steel, copper, or aluminum has been announced by the National Production Authority.

★ ★ ★

The NPA Metals and Minerals Bureau will help to see that allotments under the Controlled Materials Plan find a place as firm orders on producers' mill schedules. With this procedure in operation it will be unnecessary for persons seeking

MODEL "J" TYPE

AUTOMATIC MICRO-WELD

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

BUTT WELDERS FOR WELDING STEEL

This type welder is available in three Models J-45-S, J-5-S, and J-6-S for welding high and low carbon STEEL wire ranging in size from .060" to .375" diameter.

The welding cycle on these units is automatically completed by one downward stroke of the foot pedal, which clamps the stock being welded, contacts the welding switch, and applies the upset pressure on the weld.

All welders are equipped with annealing dies, filing vise, handshears, and mounted on 4-wheel truck.

MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 2-7468

spot assistance to come to Washington.

★ ★ ★

Before coming to NPA for assistance in placing authorized controlled materials orders, holders of CMP allotments should first make every effort to place the orders themselves.

★ ★ ★

Assistance cannot be given until the holder of the CMP allotment is prepared to show that he had tried to place his order with several suppliers and had been unable to do so. When a person has exhausted his own resources in seeking to place an ACM order he should apply to the appropriate person designated to render assistance.

★ ★ ★

The following persons in the Metals and Minerals Bureau have been assigned the primary responsibility for giving assistance in respective product areas:

Aluminum Products: Joseph Erwin, chief, Products Branch, Aluminum and Magnesium Division;

Copper Brass Mill Products: William L. Ashlock, chief, Production and Scheduling Section, Copper Division;

Copper Wire Mill Products: C. W. Ange, chief, Production and Facilities Section, Copper Division;

Copper and Copper-Base Alloy Foundry Products: Walter Clark, chief, Facilities Section, Copper Division;

Steel Products: Frank T. McCue, assistant to the director, Iron and Steel Division.

★ ★ ★

Application for assistance should be made on NPA Form 148, giving information needed to identify the particular tonnage involved. Copies of the form may be obtained from Department of Commerce field offices, NPA industry divisions, and the Steel, Copper, and Aluminum and Magnesium Divisions of NPA.

★ ★ ★

New AOA Committee Serves as Advisors for Shell Producers on Carbide Tooling Information

The American Ordnance Association now has in full operation a carbide cutting tool sub-committee of

SOMETHING NEW UNDER THE SUN!

NEW *Solar* SATURANT FOR CARDED or ROVED ASBESTOS FIXTURE WIRE

has excellent flame and moisture retardant properties . . . excellent electrical properties . . . excellent tank stability . . . superior aging characteristics.

TECHNICAL INFORMATION
Soldura KA-702

COMPOSITION:

Composed of suitable waxes and chlorinated resins with high heat stability.

SPECIFICATIONS:

Softening Point—Ball and Ring.....165-175°F.
Penetration @ 77°F., 100 Grams, 5 seconds.....20-30
Viscosity Stormer @ 130°C., 100 Revolutions..10 seconds Max.
Specific Gravity 77/77°F., ASTM D-71-27.....1.25-1.29
Flash Point ASTM D-92.520°F. Min.
Fire Point ASTM D-92.600° F. Min.
Heating Aging —100 Hours @ 130°C....Very slight change in physical properties
Recommended Operating Temperature.....265-290°F.

CHARACTERISTICS AFTER APPLICATION:

Underwriters' Flame Test—Passes with large margin of safety on #18 AF fixture wire.

Dielectric Breakdown #18AF Wire—over 2,000 Volts.

Insulation Resistance #18 AF Wire—0 Volts Leakage after three hours in salt water @ 104°F. (40°C)

Cold Bend Tests 0°C. on AF Wire—no stiffening or cracking. Passes winding on a ½" Mandrel.

Aging Test—Ten days @ 80°C., then bend around mandrel ½" @ 0°C. There is a slight stiffening, but no breaks or cracks.

Heat Stability on #18 AF Wire @ 150°C. for 5 hrs.—0 Volts leakage after 3 hrs. in salt water @ 104°F.

In addition to this new saturant, Solar also manufactures a number of other saturating and finishing compounds for both hot and cold application, for smokeless lead wire, motion picture wire, stove wire, and large cables.

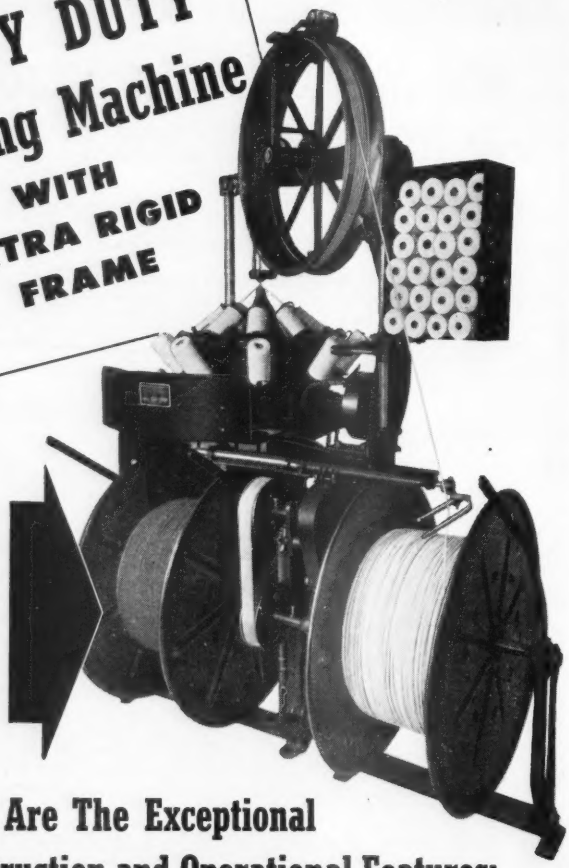
Perhaps the new saturant, or another of the Solar compounds, can help you. Our laboratory facilities and technical staff are available to you without obligation. For further information write Solar Compounds Corporation.

Write for your free copy of the new Solar Catalog containing complete product information and other valuable data.

Finishes to meet U. S. Government Specifications.

Solar Compounds Corporation
Solar Varnish Corporation
1213 WEST BLANCKE STREET, LINDEN, NEW JERSEY

16 CARRIER HEAVY DUTY Braiding Machine WITH EXTRA RIGID FRAME



Combines the advantages of a 24 carrier side delivery braider and proved economy of 16 carrier head.

Especially designed for manufacture of non-metallic, service entrance, metal shielding and other types of material.

Here Are The Exceptional Construction and Operational Features:

- A 16 carrier head equipped with a 13/16″ diameter beater opening on a 24 carrier frame.
- Aids in windup of finished product onto the reels. A more efficient windup of finished product on reels, as with 24 carrier braider.
- Flat belt friction wheels windup with foot treadle and adjustable tension spring has proved most practical.
- Reel tension can be increased or decreased by operation of foot treadle.
- Large diameter of 24 take-up wheel requires less tension for bending larger cores or solid wire.
- This braider can be furnished to use reels up to 36″ diameter x 22″ outside width.
- Supply packages: 4″ traverse, 2 11/16″ diameter on upper carriers; 5″ traverse, 2 11/16″ diameter on the lower supply carriers.

WARDWELL
BRAIDING MACHINE CO.
Central Falls
Rhode Island, U. S. A.
Representatives for Europe, British Colonies and Dependencies
JAMES MACKIE & SONS, LTD., BELFAST, IRELAND

its Shell Committee. Representing all manufacturers of tungsten carbide cutting tools, the committee serves as advisors on carbide problems arising in shell manufacturing.

★ ★ ★

All available technical data on application of carbides in shell manufacture has been assembled and a list is available to shell producers. Shell producers are being advised of additional bulletins as rapidly as they are prepared by individual carbide producers.

★ ★ ★

Assistance is also being provided to shell producers by the carbide committee on the organizing of training programs relating to the application of carbides in shell production.

★ ★ ★

Chairman of the Committee is **J. S. Gillespie,** Carboloy Department, General Electric Company, Detroit. Membership includes **P. E. Floyd,** Allegheny Ludlum Steel Corp.; **M. E. Backstrom,** Firth Sterling Steel & Carbide Corp.; **Bennett Burgoon,** Kennametal, Inc.; **R. T. Beeghly,** Metal Carbides Corp.; **H. W. Highriter,** Vascoloy-Ramet Corp.; and **W. N. Howley,** Chairman, AOA Shell Committee.

★ ★ ★

Information as to available carbide tooling data or training programs should be addressed to **J. S. Gillespie,** Chairman, Carbide Cutting Tool Sub-Committee, American Ordnance Association Shell Committee, % Carboloy Department of General Electric Company, Box 237, Detroit 32, Michigan.

★ ★ ★

Foreign Trade Agreements Affecting Scarce Metals

In view of the critical aluminum shortage, DPA entered into an agreement recently to purchase this commodity from Great Britain, in exchange for premium price steel ingots now being produced here in surplus quantities.

★ ★ ★

The policy which governed this agreement will furnish the framework within which future exchanges will be permitted, and affects the other "free" nations of the world as well as Great Britain.

★ ★ ★

Keystone of the policy is its use as a basis for future agreements designed to build our common strength. This will be accomplished by the utilization of the assets of each "free" country in ways best calculated to maximize collective security and economic contributions. Exchanges of this nature will occur only when they specifically serve the national interest and confer concrete advantages to all participating nations.

★ ★ ★

The simple facts of the transaction were:

1. The purchase by Great Britain of 46,000 tons of "premium price" steel ingots in the United States and the receipt by Great Britain of 28,500 tons of iron and steel scrap from German sources.

2. In return, Great Britain will divert 22,045,000 pounds of aluminum to the United States, over the next five months.

★ ★ ★

The recent Truman-Churchill discussions resulted in supplementary agreements affecting four basic metals:

1. Great Britain will purchase from the United States approximately 1,000,000 long tons of steel, scrap and pig iron in 1952, including 46,000 tons of "premium price" steel ingots previously announced.

(a) About 800,000 long tons will be steel in shapes and forms which we can best spare; the balance will include scrap and pig iron now earmarked for the United States from overseas sources.

(b) The 800,000 long tons represents less than one percent of total United States steel production. This export tonnage will not interfere with current defense production in the United States, nor will it curtail civilian allocations in the first and second quarters of 1952.

2. A total of 55,100,000 pounds of Canadian aluminum (including the 22,045,000 pounds already negotiated for) will become available to the United States during 1952, to be repaid to Great Britain by mid-1953, when this country's own aluminum production will be greatly expanded.

3. By arrangement with Great Britain, Canada will raise its current exports of copper to the United States by as much as 25%. This promises relief in a crucial area as copper is now in short supply.

4. Great Britain will also furnish to the United States 20,000 long tons of Malayan tin, at $1.18 per pound.

★ ★ ★

The reason for the deal was the difficult aluminum problem faced by America during the latter part of 1951.

★ ★ ★

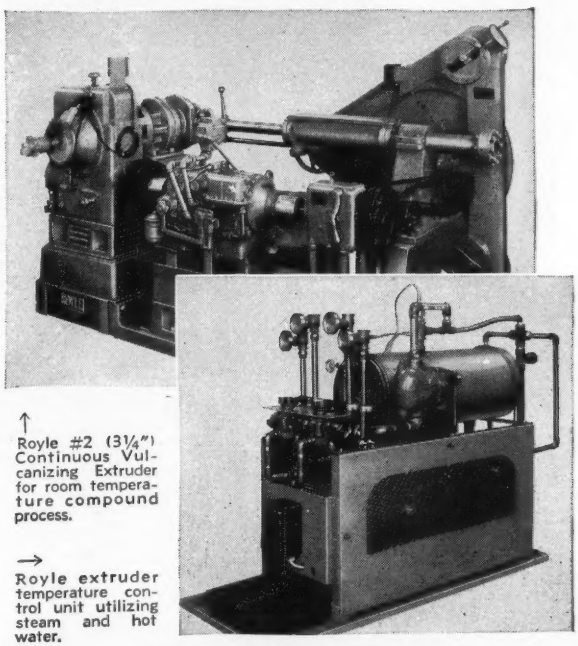
Direct military and important defense-supporting requirements had already been satisfied. But reduction of allotments to manufacturers of less essential types of consumer

Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

**Licensees of Western Electric Company*

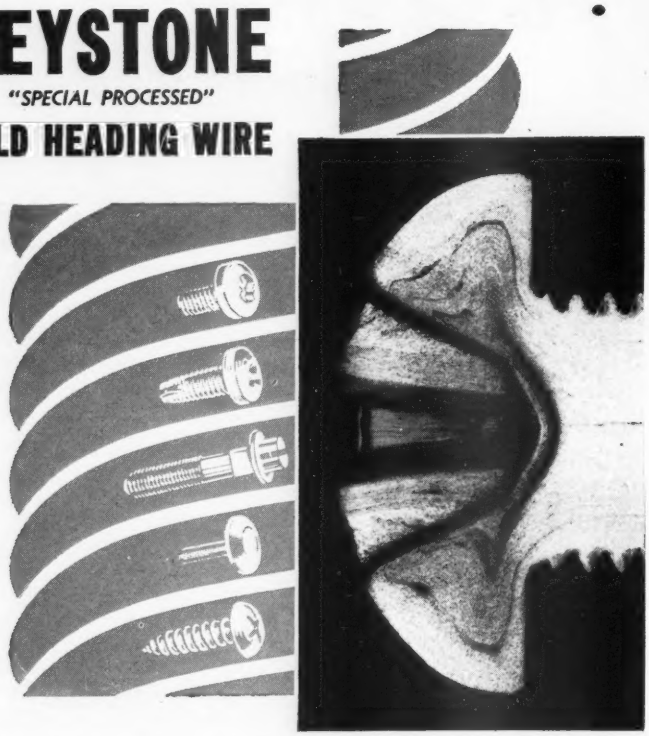
JOHN ROYLE & SONS
10 ESSEX STREET, PATERSON 3, NEW JERSEY

Flows without a flaw . . .

KEYSTONE

"SPECIAL PROCESSED"

COLD HEADING WIRE



Thousands of "tough-to-make" pan-head recessed screws are made every day from Keystone "Special Processed" Cold Heading Wire. The extremely severe displacement of metal during manufacture of this type head requires special wire that will flow with unbroken fibres. (The above macrograph clearly shows long unbroken flow lines.)

Carefully selected ingredients; our own exclusive drawing and heat treating processes; rigid quality control and inspections — make Keystone "Special Processed" Cold Heading Wire the most suitable for this and other unusually difficult cold heading problems.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company

PEORIA, ILLINOIS

goods to as little as 10 to 15% of their pre-Korea consumption was anticipated.

Copper

The Nation's copper needs for 1955, estimated at 2,270,000 short tons as compared with the 1,914,000 tons available for all purposes in 1951, will be substantially met with the aid of the long-range expansion and development program of the **Defense Materials Procurement Agency, Jess Larson,** Administrator of DMPA, stated recently.

★ ★ ★

"Copper is the cornerstone of our national defense metals expansion program and we have spared no effort to develop every possible source of supply," Mr. Larson said. "Increasing the domestic production of critical metals such as copper however, necessarily involves a long-range program of construction and expansion of existing facilities. In addition to our efforts here at home, therefore, we will continue to search the free world for sources of this vitally-needed metal at a reasonable price. Contracts already closed or under negotiation are expected to result in an "assisted supply." This is production in excess of that which otherwise could be anticipated—of 247,000 tons in 1955.

★ ★ ★

This amount, when added to the estimated "unassisted supply"—receipts from domestic production, scrap and imports—of 2,020,000 tons in 1955, which takes into account decreased yields from existing mines, would bring the total tonnage of copper available to 2,267,000, only 3,000 tons short of projected requirements. The estimated needs include copper for civilian use, military and atomic energy requirements, stockpiling and export.

The Diamond Tool Industry in 1951

Industrial Diamond Information Bureau, 32-34 Holborn Viaduct, London, E.C. 1, England, has issued a small brochure summarizing the articles and patents that have been published during 1951 and that have a special bearing on industrial diamonds.

★ ★ ★

Practices in the Manufacture of Steel for Seamless Tubing

A detailed survey of the best United States practices in producing steel for the manufacture of seamless tubing is now available to the public, the **Office of Technical Services,** U. S. Department of Commerce announced recently.

★ ★ ★

Prepared by the Office of Technical Services with the assistance of metallurgists in the American steel industry, the survey was undertaken for the Mutual Security Agency. Roy W. Tindula, Chief of OTS's Metals and Minerals Section conducted the survey and authored the reports.

★ ★ ★

The steels used for seamless tubes must be sound both externally and internally because of the severe forging operations involved in piercing. The report treats mainly the methods employed in melting basic electric steel and casting by bottom-pouring to obtain steel of best quality for this purpose.

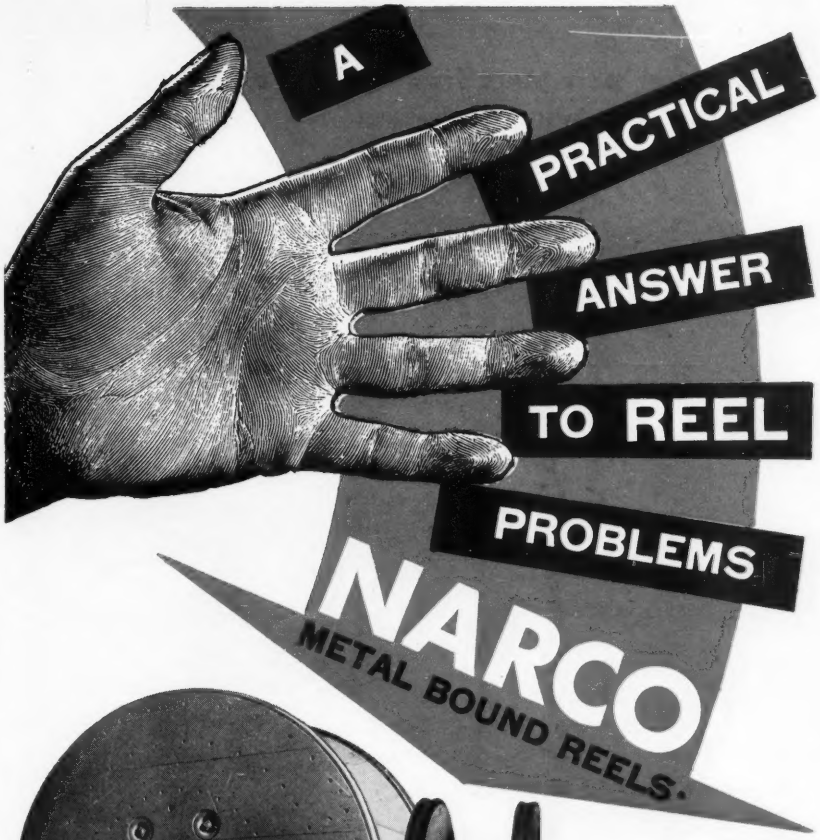
★ ★ ★

The report shows that amount and time of additions of iron ore to the electric furnace melt are important in production of highest quality rimmed or killed types of steel. A strong boil of the molten bath must be maintained by correct ore additions in order to avoid hydrogen absorption with attendant lowering of ductility and soundness of the cast ingot product. The optimum time of manganese addition to the melt is also discussed with respect to its effect on steel ingot quality and efficiency of manganese recovery.

★ ★ ★

Bottom-pouring is used instead of the more common top-pouring methods in order to get improved ingot surface and yield. Technical details of ladle and runner refractories and design in American and German practice are compared. Controlled pouring temperatures and speeds, mold preparation and coatings, new heat generating or insulating methods for hot tops, and metallurgical inspection controls are other practices employed to obtain high yields and an improved steel ingot product.

★ ★ ★



Such reels, of **NARCO** construction, combine **ECONOMY** with **SERVICE.**

They'll give three times as many trips and require no repairs. They cost only an average of 50% more per reel, yet cut your reel bills up to 300%.

Yes, we also build all-wood reels—any size from 12″ in diameter up. Metal Bound Reels made in 12″ through 48″ diameters.

Reels are furnished assembled or knocked down, as you prefer. Reel heads for steel drums.

If you are economy-minded and quality-conscious, you will want NARCO METAL BOUND REELS.

May we quote you on your REEL REQUIREMENTS?

North Anson Reel Co.

TELEPHONE MADISON 187-2 NORTH ANSON, MAINE

Cover non-metallic sheathed cable, building wire and weatherproof wire

1800 feet an hour

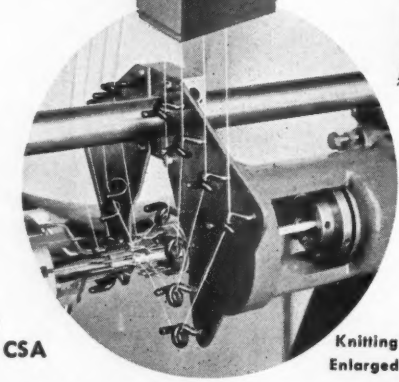
with

***Fidelity* SINFRA**

KNITTERS

Model C-3H Knitter & Haul-Off Reel Stand

- ★ Increase speed 10-15 times
- ★ Save on cost of yarn
- ★ Boost labor output 600%
- ★ Eliminate yarn rewinding
- ★ Conserve floor space
- ★ Cut maintenance costs
- ★ Reduce power requirements
- ★ Minimize operating noise
- ★ Improve working conditions
- ★ Provides automatic control
- ★ Lower your capital investment
- ★ Approved by UL, ASA, AAR, CSA



Knitting Head Enlarged View

This *Fidelity Sinfra* Wire Covering Machine offers you high production speed and low operating cost. The output of *one* Knitter equals 15 conventional machines. Savings in yarn costs and direct labor alone pay for this new equipment in 12 to 24 months. Knit products are universally used and meet all standards.

The modern Fidelity Sinfra method uses fewer yarns and large 3 pound cones located on a stationary creel. High-speed, rotating Knitting Heads cover the wire at 30 or more feet per minute. Design permits horizontal operation at convenient working level with no crawling or stretching. Automatic electric stop motions and other advanced features cut maintenance and down time.

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Manufacturers of intricate precision machinery since 1911

FIDELITY MACHINE COMPANY INC.

3908 FRANKFORD AVE. • PHILADELPHIA 24, PA.

AIME to Hold Metals Conference in Spokane

Leading mining metallurgical technologists will confer May 8, 9 and 10 at Spokane, Washington's Davenport Hotel in the first Northwest Metals and Minerals Conference. More than 35 technical papers will be presented covering a wide range of interests in mining, extractive metallurgy, and physical metallurgy.

★ ★ ★

G. S. Barrett of the Institute for the Study of Metals, Chicago, and **J. B. Hess** of Kaiser Aluminum and Chemical Corporation's Division of Metallurgical Research will offer a paper on "The Transformation in Cobalt-Nickel Alloys". "Corrosion of Aluminum" will be the subject of a talk by **R. S. Dalrymple,** General Electric Company, Richland, Washington. **K. T. Aust** and **F. R. Morral** of Kaiser Aluminum's Division of Metallurgical Research will speak on "Preferred Orientation and Directional Properties of 2S Aluminum".

★ ★ ★

Sponsored by the Columbia Chapter of the AIME, the conference will be largely slanted toward students of mining and metallurgy in the Northwest. Students, educators, and men of the mining and metals industries in seven Western and Northwestern states and British Columbia will participate. Plant visits are planned to the magnesium plant operated by Pacific Northwest Alloys Corporation at Mead, Washington; Kaiser Aluminum and Chemical Corporation's aluminum reduction plant, also at Mead; and the Kaiser Aluminum rolling mill at Trentwood, Washington.

★ ★ ★

Hickernell Discusses Aluminum Wire Manufacture

L. F. Hickernell, chief engineer at **Anaconda Wire & Cable Co.,** Hastings, N. Y., was a guest member of a recent round-table on: "Is Aluminum the Eureka for the Copper Shortage," presented before the New York section of the American Institute of Electrical Engineers.

★ ★ ★

Panel speakers, in addition to Mr. Hickernell, who had been invited to present the manufacturer's viewpoint on aluminum wire, included:

Max E. Noyes, manager, Electrical Conductor Div. of ALCOA; **H. W. Biskeborn,** technical director, Kaiser Aluminum & Chemical Corp.; **I. Matthysse,** chief design engineer, Burndy Eng. Co.; **J. R. Meehan,** vice president, Fishback, Moore & Morrissey (Chicago); **M. D. Bergan,** director of research, Thomas & Betts; and **C. B. Xenis,** division engineer, EE Dept. and **A. F. Newman,** engineer, both of Consolidated Edison.

★ ★ ★

Mr. Hickernell confined his remarks to manufacturers' problems; users' problems and mutual manufacturer-user problems.

★ ★ ★

"Common sense," Mr. Hickernell said, "requires that instead of a willy-nilly substitution of aluminum for copper, a carefully thought-out, **selective** program should be followed. Moreover, I would like to point out that Anaconda Wire & Cable Co.'s parent company does not believe that there will be a long-range copper shortage. You can find out 'why not' if you will read the statement by Mr. Kelley, chairman of the board. It appears in current issues of the technical press."

★ ★ ★

Establishes Plant in Connecticut

Continental Wire Corporation, of York, Pennsylvania, has opened a new plant in Wallingford, Connecticut, taking over a building formerly occupied by The Revere Corporation, who have built and moved into a new plant in the city. Continental, manufacturers of special electric wire and cable, is headed by **C. C. Christiansen,** President.

★ ★ ★

New Field Service Reports Available

Oakite Products, Inc., 22 Thames St., New York 6, N. Y., has issued two new reports.

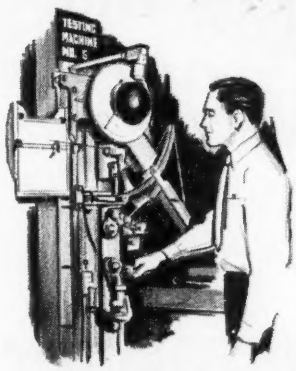
★ ★ ★

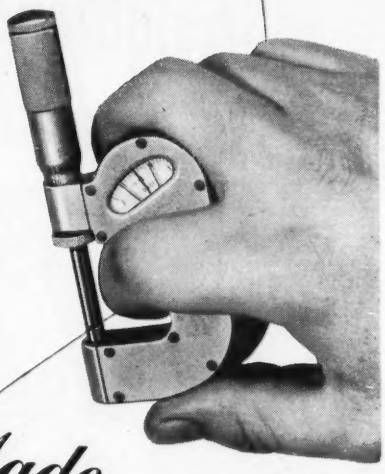
The first is entitled "A New Answer to Hard Water Problems", which describes the use of Oakite Composition #53 in softening water. Numerous case histories are cited.

★ ★ ★

The second is called "100% Pickling Action Without Fumes," which describes the use of a foam blanket designated as Oakite Com-

JOHNSON

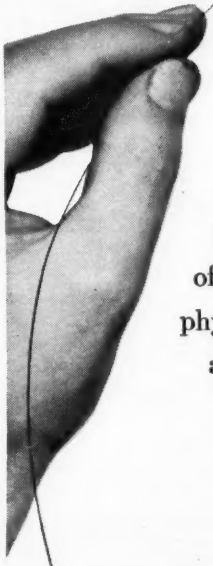


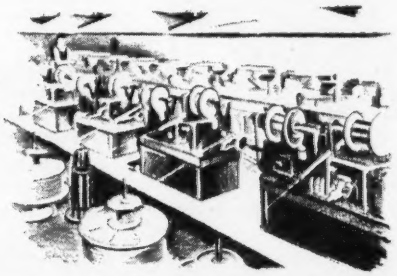


Custom-Made

Specialty Wires

A quarter of century of progress —new and better ways to produce custom-made specialty wires, wires of absolute uniformity of prescribed physical and metallurgical properties and drawn exactly to the size which best meets your requirements.





"Johnson Sets the Standard of the Industry"

JOHNSON

JOHNSON STEEL and WIRE CO., INC.

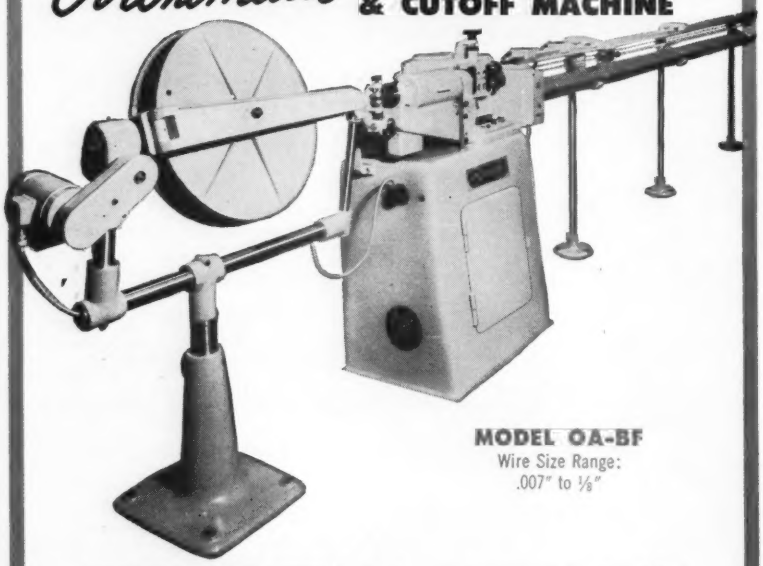
Worcester 1, Massachusetts

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

High Speed Precision Straightener For Wire As Small As .007"!

MEDART

Minimatic WIRE STRAIGHTENING & CUTOFF MACHINE



MODEL OA-BF
Wire Size Range:
.007" to ⅛"

- *COMPLETELY NEW* in design and operation, the Minimatic establishes far higher than usual standard for economy, accuracy and speed in the straightening of small round wire.
- Fully automatic and self-feeding after coil is started into machine. Full vision push button control panel.
- Entire coil is straightened and cut without attention from operator. Disc-type cutoff, with only 2 moving parts, is electronically operated. Protects against swelling and expansion of wire ends.
- Adjustable rotary die straightening mechanism insures maximum precision for any size wire within range of machine.
- Floor space 7′ 4″ x 2′ 0″ plus length of runout section. Requires only 2 H.P.
- A "must" for manufacturers of needles, watches, other small assemblies in which precision-straightened fine wire is used.

Write For Brochure

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MISSOURI

position #38. Full information on how it is to be used and what it accomplishes are given. Either or both of these are available upon request.

Alcoa Plans Expansion Facilities in Pacific Northwest

Plans for the expansion of **Aluminum Company of America's** fabricating facilities in the Pacfiic Northwest have been announced by **C. S. Thayer,** Alcoa's Manager of Northwest operations. A definite schedule for construction has not been set.

★ ★ ★

Immediate plans, which have been in the making for some time, call for extensive modernization and revision of the ingot casting facilities at Alcoa's Vancouver (Wash.) This would mean increased production of commercial notch-bar ingots and rolling ingots as well as the production of extrusion, forging and other types of fabricating ingots for use by Alcoa's own operations and for sale to fabricating customers. Cost of the immediate expansion will be $1,217,500.

★ ★ ★

The new facilities, when they are constructed, will complement the cable mill which Alcoa opened at Vancouver in August 1949 and which presently is operating at capacity upon high priority aluminum cable, steel reinforced (A.C.S.R.) for the accelerated electrification of the country.

★ ★ ★

New Folder Describes Spoolers

A new folder describing two improved spoolers has been issued by the **Robert J. Emory Co.,** 31 E. Runyon St., Newark 5, N. J.

★ ★ ★

These spoolers are Models No. 300, for fine wire (.003″ to .040″), and No. 1900-H.V., for intermediate wire (.010″ to .080″). Both are sturdy, precision machines that will produce a uniform, dense wire lay with minimum effort. Smooth starting and fast stops are characteristics of these spoolers, with power applied in such manner that wire damage, necking and breaking are eliminated.

★ ★ ★

The heart of the Emory spooler is the traverse that will give positive, consistent and pin-point reversals, that can be adjusted from

minimum to maximum without stopping the spooler and that requires no tools for adjustments.

★ ★ ★

Full details are given in the folder, a copy of which you are invited to send for.

★ ★ ★

"Protection for Aluminum"

A new bulletin of the above title has been issued by **American Chemical Paint Co.**, Ambler, Pa., describing their "Alodine", a chemical used to treat aluminum surfaces. It can be applied either by brushing or spraying, providing a tough durable coating. The equipment required, the method of cleaning and other steps are described and illustrated. The coating will give good protection in itself, but also provides a base to which paint will adhere if a painted finish is desired. Copies of the bulletin will be sent upon request.

★ ★ ★

The Welding of Non-Ferrous Metals

This new book, written by **E. G. West**, Technical Director of The Aluminum Development Association, and published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York City, is an important contribution to the literature on welding.

★ ★ ★

Various chapters take up welding procedures for certain non-ferrous metals and their alloys, the metals covered being aluminum, magnesium, copper, nickel, lead, zinc and precious metals. A chapter on pressure welding is included.

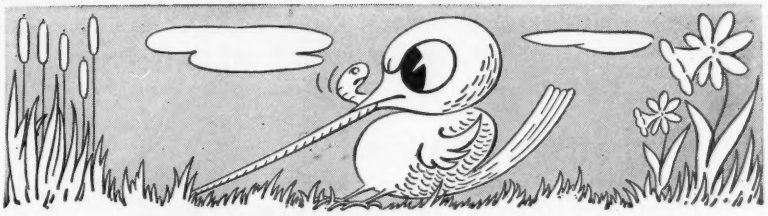
★ ★ ★

The author goes into the various types of welding that may be employed, indicates how a proper method should be selected and covers such points as the proper method of preparing stock for welding.

★ ★ ★

The text covers 553 pages and the book is priced at $3.50 per copy.

★ ★ ★



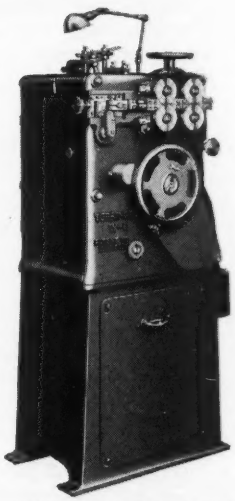
For the best spring every time

see the man with a

Versatile Torrington Spring Coiler

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.

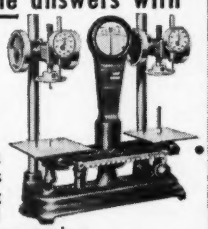
Torrington's 14 different Spring Coilers cover a range of wire diameters from .003" to .750"



MODEL W-11 SPRING COILER

Wire diam. range: .015" to .072". Length per spring: 0" to 42". O. D. Coil Range: 3/32" to 1 9/16". Produces 23 to 190 springs per minute with variable speed drive. Extra wire feed gears, torsion, other attachments available.

NOW... Spring Makers and Users can get the same answers with The TORRINGTON SPRING TESTER



An accurate, uniform and inexpensive means of measuring spring load and deflection! For inspection or in-use testing . . . to aid in designing and developing springs for specific uses or as a basis for statistical quality control. Write today for illustrated bulletin on the Torrington Spring Tester!

The TORRINGTON MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

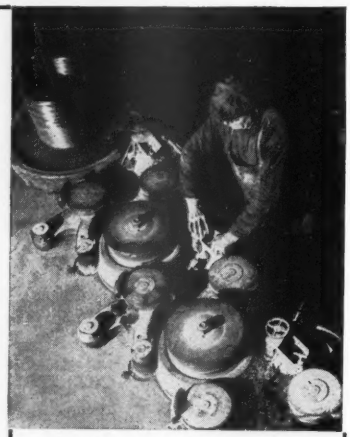
AMERICAN CHEMICAL PAINT COMPANY
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: IMPROVED DRAWING AND COLD FORMING WITH GRANODRAW

INTRODUCTION:

When steel is phosphate coated with "Granodraw" prior to working it, drawing, extrusion, and other cold forming operations are greatly improved. In fact, the protective phosphate coating makes the cold extrusion of steel possible.

Getting cold steel to flow depends on the unique properties of this coating. Its non-metallic phosphate crystals are physically and chemically adapted to acquire a strongly adsorbed lubricant. The combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction while maintaining its integrity under extremely high deforming pressures.



The drawing of wire and many other cold forming operations — including the cold extrusion of steel — are greatly facilitated by the application of a "Granodraw" phosphate coating and a suitable lubricant prior to working.

"GRANODRAW" DATA

"Granodraw" zinc phosphate coating chemical is applied to pickled surfaces in an immersion or spray process. When used with a suitable lubricant, the coating reduces friction under conditions of low, medium, or high deforming forces encountered in such typical operations as: cold extrusion of steel; cold shaping; deep drawing (tubs, cartridge cases, shells, etc.); stamping; drawing of wire and tubing; ironing; necking; nosing; and upsetting.

ADVANTAGES OF PHOSPHATE COATING WITH "GRANODRAW" PRIOR TO COLD FORMING STEEL

The following are among the advantages indicated for phosphate coating with "Granodraw" prior to cold forming steel:

Drawing of wire, bars, tubing, etc. — Improved lubrication; improved surface; less scratching; reduced pull; greater percent reduction per pass; reduced die wear; longer die life; lower die maintenance and cost; reduction in corrosion.

Drawing of stampings, shells, shell cases, etc. — Improved lubrication; reduced breakage; reduction in scrap; deeper draws; less scratching; elimination of some annealing; less wear on dies.

Cold Extrusion — Improved lubrication; increased strength of parts; improved surface; reduction in load on press; greater dimensional accuracy; more uniform wall thickness; longer extrusions; elimination of some annealing; less corrosion.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "GRANODRAW" AND ON YOUR OWN METAL PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

Dun & Bradstreet Business Charts

Business has been valving off some of its inflationary pressure according to a compilation of a dozen charts released by **Dun & Bradstreet, Inc.** under the title of "The Economic Picture Entering 1952."

★ ★ ★

The charts, which cover both 1950 and 1951, follow the trends in commerce, industry and finance. Although an inflationary trend was touched off by the outbreak of the Korean War, the curve appears to have flattened out in 1951 at higher levels of production and employment.

★ ★ ★

Certain war-induced changes are evident. For example, Motor Vehicle Production is lower in 1951 than in 1950; the same is true of New Housing Starts. But Steel Production is at an all time high, and Machine Tool Production is accelerating. Finance, reflecting the excitement of a defense economy, is also an active field. Commercial, Industrial & Agricultural Loans are well above 1950 levels, as are Stock Markets Prices.

★ ★ ★

The other charts included in the compilation are Per Capita Disposable Income, Industrial & Commercial Failures, Insured Unemployment, Electric Power Output, Apparel Manufacturing, and Department Store Sales.

★ ★ ★

Nukem Makes Changes in Officers

At a meeting held recently in Buffalo, the board of directors of the **Nukem Products Corporation**, Buffalo 20, New York, made **Richard Neuhaus** Chairman of the Board and elected **John W. Chandler** President of the company.

★ ★ ★

The company has long been well-known in wire circles as manufacturers of pickling and plating tanks and accessory equipment and supplies.

Outstanding Personalities of the Wire Industry

Crater of U. S. Rubber Joins NPA

Willard DeCamp Crater, Jr. has been appointed chief of the thermoplastics section, Chemical Division, National Production Authority in Washington, D. C.

★ ★ ★

Mr. Crater, who is the assistant manager of vinyl sales for the **Naugatuck Chemical Division, United States Rubber Company,** has been given a leave of absence by the company in order to assume the government post.

★ ★ ★

Mr. Crater brings to his new position a wide experience in plastics research and manufacturing with such companies as the Hercules Powder Co., Federal Telephone and Radio Corp., Glenn L. Martin Co., and Naugatuck Chemical. He holds numerous patents in plastics used in the wire and cable industry and other fields.

He is a member of the New York and Washington Rubber Groups of the American Chemical Society, the Wire Association and is past president of the Baltimore-Washington section of the Society of Plastic Engineers.

★ ★ ★

C.F.&I. Elects Officers

Alwin F. Franz was elected President of **The Colorado Fuel and Iron Corporation** at a meeting of the Board of Directors in February. The announcement was made by **Charles Allen, Jr.,** Chairman of the Board.

★ ★ ★

At the same time, **Carl W. Meyers,** who has been President of Colorado Fuel and Iron since 1946, was elected Vice Chairman of the Board of Directors.

★ ★ ★

Mr. Franz has been Executive Vice President of The Colorado Fuel & Iron Corporation since 1949, and a Director since 1948. Prior to that, he served as Vice President in Charge of Operations, and has also managed the Corporation's two largest plants. Until 1945 he was General Superintendent of the Steel Division of Alan Wood Steel Company.

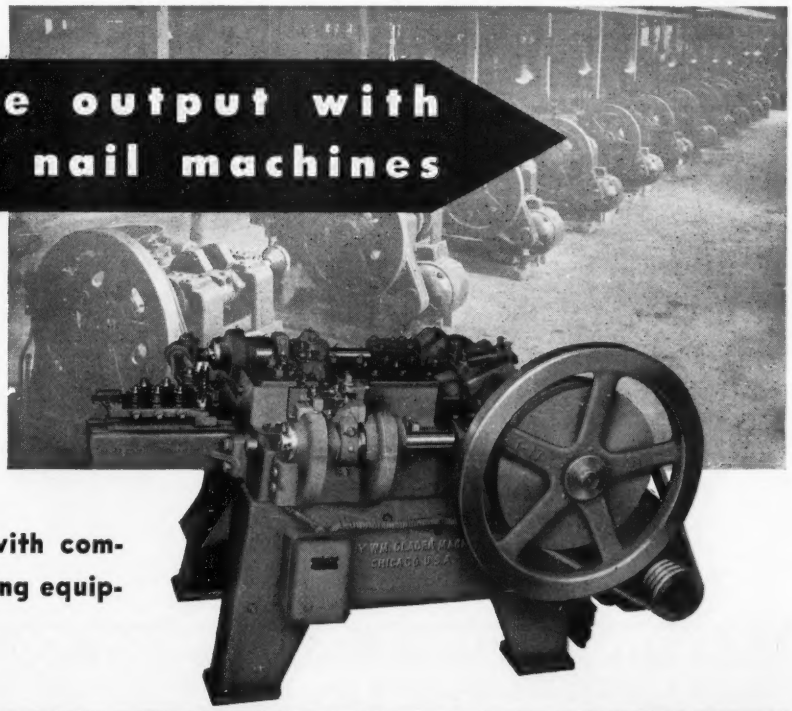
★ ★ ★

In announcing the two elections, Mr. Allen said that: "As Vice Chairman of the Board, Mr. Meyers' full experience will be available in connection with the program of plant expansion and diversification, which was planned and initiated while he was President."

★ ★ ★

Under the leadership of Mr. Allen, Mr. Meyers, and Mr. Franz, Colorado Fuel & Iron recently completed a $50,000,000 financing program, which will be used to build a new seamless pipe mill at Pueblo, Colorado; and for other plant im-

high tonnage output with GLADER wire nail machines



A size and type machine available to make everything from tacks and brads to 12" spikes with maximum efficiency.

Write for 12 page bulletin with complete information on nail making equipment.

WM. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

provements.

★ ★ ★

The Colorado Fuel & Iron Corporation is the ninth largest steel producer in the United States. It operates steel plants at Pueblo, Colorado; Buffalo, New York; and Claymont, Delaware; and a Blast Furnace Division at Birdsboro, Pennsylvania. Colorado Fuel & Iron's seven fabricating plants are located at Palmer, Clinton, and Worcester, Massachusetts; Mount Wolf, Pennsylvania; South San Francisco and Oakland, California.

★ ★ ★

Mr. Franz in assuming his new role as President expressed confidence that with the continuance of the fine cooperation now existing between labor and management the Corporation would maintain its high standard of nation-wide service.

★ ★ ★

James R. Wyatt

The Ajax Electric Furnace Corp. has announced the death of its vice president, James R. Wyatt.

Western Electric Appointments

George A. Landry, President of **Sandia Corporation,** and **Donald A. Quarles,** vice president of **Bell Telephone Laboratories,** have been elected vice presidents of **Western Electric Company, Inc.,** effective March 1, it has been announced. Resignation of both men from their previous positions became effective February 29. Western Electric is the manufacturing and supply unit of the Bell Telephone System.

★ ★ ★

In his new position Mr. Landry is concerned with Western Electric purchasing and traffic matters and in May he will take over responsibility for such activities when **Douglas F. G. Eliot,** vice president, retires under the Company's pension plan.

★ ★ ★

Mr. Quarles has also been elected President of Sandia Corporation in which position he succeeded Mr. Landry on March 1. Sandia Corporation a subsidiary of Western Electric, is operating the Sandia Laboratory of the Atomic Energy Commission under a contract between Western and the Commission. The laboratory, located at Albuquerque, New Mexico, is concerned with military applications of atomic energy.

★ ★ ★

Mr. Landry has been President of Sandia Corporation since 1949 when Western Electric took over the responsibility of operating the Sandia Laboratory. He joined Western Electric in 1911 and has occupied important positions in its manufacturing operations, including that of operating superintendent at the Company's Hawthorne Works in Chicago and assistant manager of military products manufacture at Kearny, New Jersey. In 1945 he became operating manager of the Company's nation-wide installation force. During the war he headed for a year the staff branch of the production division of the Office of Production Management, later known as the War Production Board.

★ ★ ★

Mr. Quarles has been associated with the Bell System since 1919. He became a vice president of Bell

NRM

"ALL-IN-ONE"... WIRE COVERING UNIT

Includes:

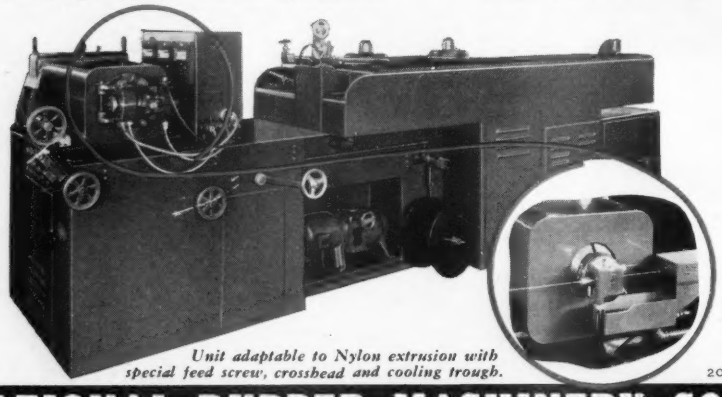
NRM's 1½" Package Wire and Cable Covering Unit packs the maximum of production into the minimum of floor space. Measuring only 13'x4'2" on its single base, this compact unit carries all the equipment needed to cover wire up to ¼" covered diameter at speeds up to 1000 feet per minute.

All wire covering plastics can be handled on this precision-built equipment — including Nylon, with a few simple changes. The automatic driven let-off is controlled by wire tension. The electrically heated 1½" extruder is equipped with Balanced Heat Control. The haul-off capstans are variable speed driven. The torque controlled dual take-up has 16" standard reels. Ample space is provided for a spark tester.

This unit is also available with an oil heated extruder.

Write, right now, for detailed information!

- Driven Supply Reel
- Wire Straightener
- NRM 1½" Extruder
- Variable Speed Drive
- Electric Die Heater
- Water Cooling System
- Dual Haul-off Capstans
- Dual 16" Take-up
- Adjustable Traverse
- Single Base Mounting



Unit adaptable to Nylon extrusion with special feed screw, crosshead and cooling trough.

2022

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories: Akron 8, O.
East: 1180 Raymond Blvd., Newark, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
Export: Omni Products, 460 4th Ave., New York 16, N. Y.

Creative Engineering

Telephone Laboratories in 1947. Previously he had served the Laboratories as director of important areas of its development work. During the war he was a leader in the development of military electronic systems, particularly radar. He is presently chairman of the Committee on Electronics of the Research and Development Board of the U. S. Government. He is a member of many professional and engineering societies and has served as a member of the Board of Directors of the American Institute of Electrical Engineers. In January 1952 he was nominated for the presidency of the latter organization.

★ ★ ★

Mr. Eliot, vice president—purchasing and traffic of the Western Electric Company, will have completed 40 years of service with the Company when he retires in May. He has held many positions of responsibility in connection with sales, personnel and purchasing, including tours of duty in Japan and Europe. He was appointed personnel director in 1929 and general commercial manager in 1937. Two years later he became general purchasing agent and in 1942 the Company's traffic activities became his responsibility also. He has been a vice president since 1946.

★ ★ ★

T. F. Patton Appointment

T. F. Patton, V. P., & G. M., Republic Steel Corporation.

T. F. Patton is vice president and general counsel for Republic Steel Corporation.

★ ★ ★

Mr. Patton has served as general counsel of the corporation since 1937 and was elected a director in February, 1943.

★ ★ ★

Prior to coming with Republic Mr. Patton was a partner in the firm of Belden, Young and Veach, Cleveland law firm. Mr. Patton graduated from the College of Law, Ohio State University, in 1926. He joined Republic's legal staff ten years later in 1936, and was elected vice president in 1944.

★ ★ ★

Spring Division of Eaton Gets New Chief Engineer

Michael C. Turkish has been appointed chief engineer, coil spring department, **Eaton Mfg. Co.'s** spring division, Detroit.

MORE PRODUCTION WITH
Lundahl
Specially Selected and Graded
CARBIDE TOOLS
On Your Spring-Making Machines

They enable you to get fast, steady production of perfect springs on your machines with the least idle time for tool changes.

Lundahl Engineers will provide just the right carbide tools for Sleeper & Hartley, Torrington or other spring-making machines. Let us show you how to save money on spring making jobs. Wire today—there's no obligation.

ASK ABOUT THE LUNDAHL SET-UP TOOL KIT FOR SPRING MAKERS.

LUNDAHL CORPORATION
Specialists in Tooling for Spring Makers
1429 Park Street, Hartford 6, Conn.

Chicago Steel and Wire Places Steffan in Charge of Sales

Announcement has just been made by **Dana Summers**, President, of the appointment of **James C. Steffan** as Vice President and General Sales Manager of the **Chicago Steel & Wire Company** in Chicago, Illinois.

★ ★ ★

Mr. Steffan has been associated with the Chicago Steel & Wire Company for the past fifteen years. His first connection was as Sales Representative in Columbus, Ohio and he later became District Representative covering the midwestern territory. Mr. Steffan has assumed his new capacity in Chicago as of February 1, 1952.

★ ★ ★

The Company manufactures SUPER-STITCH Bookbinders' and Boxmakers' Stitching Wire as well as many other types of low carbon steel wires. The company maintains offices and jobbers throughout the entire United States.

★ ★ ★

Faster, More Accurate
STRAIGHTENING and CUTTING
with the
NORSHOLM "WIRE MASTER"

So fast, a customer is finding that *two* machines will do the work of *six* machines formerly used.

Model A, shown, will handle .040" to .156" wire.

Other models will handle up to .312"Stock,round.

NORSHOLM "WIRE MASTER" machines will also straighten and cut capillary tubing. Cuts clean so that the hole is not closed.

The "WIRE MASTER" cuts lengths as small as 1 1/2" to within .005" tolerances, with the *cleanest and most accurate* cut-off on the market.

IT'S RUGGED, VIBRATIONLESS, FAST!

As to speeds, 180 to 200 F.P.M. is the minimum to be expected. Your cutting jobs will be studied and speeds *guaranteed.*

Also makers of heavy duty double, tilt type and single wire reels.

Write today for information on these remarkable machines

NORS-HOLM MACHINE DIVISION
NORS-HOLM INDUSTRIES, INC.
808 S. ROCHESTER ROAD • ROCHESTER, MICHIGAN

Weiss Made Manager of Two G.E. Wire Plants

Leo G. Cover has retired as manager of **General Electric Co.'s** two wire producing factories, the Cleveland Wire Works and Dover Wire Works, Dover, O. He completes 42 years of association with GE. He is succeeded by **Herman L. Weiss,** who has been assistant manager of the two plants.

★ ★ ★

R. W. Pflug Named as Coordinator of Inquiries for Detrex

The appointment of **R. W. Pflug** to the post of Coordinator of Inquiries for the Industrial Sales Division was announced by **W. F. Newbery,** Director of Sales for the **Detrex Corporation,** Detroit 32, Michigan.

★ ★ ★

This new position will provide an efficient liaison between the company's field representatives and the engineering department. Mr. Pflug's 15 years of experience with Detrex in the sale and service of all types of industrial metal cleaning equipment will greatly increase the speed and effectiveness with which each customer inquiry can be processed.

★ ★ ★

Pflug's duties will include thorough analysis of each equipment request with regard to exactness of information and selection of the proper equipment for the specific requirements of each customer.

★ ★ ★

Joins Sprague Design Staff

John H. Harley has been added to the radio interference filter staff of engineers at the Culver City, Calif., application engineering laboratory of the **Sprague Electric Company.** Mr. Harley was previously electrical design engineer at the El Segundo, Calif. division of the Douglas Aircraft Co., where he specialized in work on electrical components and control circuits for aircraft.

★ ★ ★

OUR 1952
WIRE & WIRE PRODUCTS
DIRECTORY
WILL BE OFF THE PRESS
APRIL 1st

New Cleveland Tramrail Distributor in Philadelphia Territory

The Cleveland Tramrail Division of The Cleveland Crane & Engineering Company, Wickliffe, Ohio, announces the appointment of **W. A. York Company,** 945 South 53rd Street, Philadelphia 43, Pennsylvania, as exclusive Sales Representative for Philadelphia and surrounding territory.

★ ★ ★

All activity will be under the jurisdiction of **Mr. W. A. York,** who has up until this time been connected with the Home Office organization of Cleveland Tramrail as Assistant Chief Engineer. His thorough knowledge will enable him to competently advise in the planning, designing and erecting of Cleveland Tramrail overhead materials handling equipment. Complete erection and service facilities will be available.

★ ★ ★

F. K. Lacher Joins NRM

The National Rubber Machinery Co., Akron, Ohio, recently announced the appointment of **Frederick K. Lacher** as Assistant Secretary in charge of patent work. Mr. Lacher is a member of the Bar of the State of Ohio and a registered Patent Attorney. He also holds a degree of Bachelor of Science in Mechanical Engineering from Carnegie Institute of Technology. Just prior to joining NRM, Mr. Lacher was employed in the Patent Department of the B. F. Goodrich Company.

★ ★ ★

Macwhyte Elects Officers

George C. Wilder was recently elected vice-president and assistant general manager, MACWHYTE CO., Kenosha, Wis. **Jessel S. Whyte,** elected president and general manager; **H. E. Sawyer,** elected vice-president and treasurer; **R. B. Whyte,** elected vice president in charge of operations; and **R. P. Tyler,** elected vice-president in charge of sales.

Joerres Made Production Manager, Bristol Division of A.S.C.

The retirement of **Lisle K. Lasher,** production manager of the Bristol Divisions of Associated Spring Corporation, has been announced by Carlyle F. Barnesm general manager. Mr. Lasher has been identified with the corporation since 1910 and for more than 30 years has served as manager of production.

★ ★ ★

Ralph H. Joerres has been chosen to succeed Mr. Lasher and **David E. Waite** has been appointed to the position of chief product engineer.

Heyman Rosenberg

Heyman Rosenberg, founder of the **Parker-Kalon Corporation** in 1913 and inventor of a screw that cuts its own thread, died on February 29th while on vacation in Hollywood, Florida.

★ ★ ★

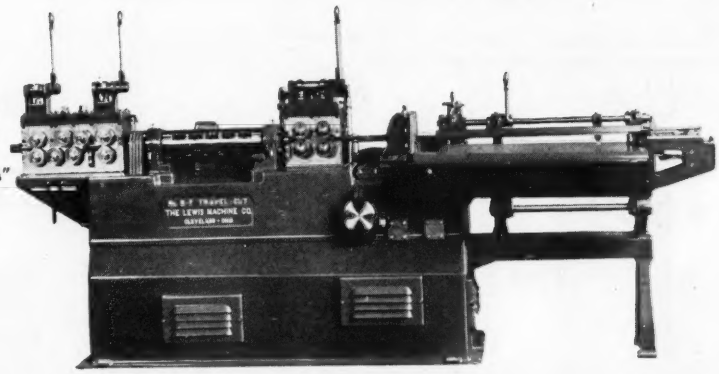
Mr. Rosenberg, who was 78, resided at 211 Central Park West. He held more than 200 patents relating to fasteners or the machinery for producing various types of fasteners. He had been honored by the Franklin Institute for being outstanding in his work.

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS **TRAVEL-CUT**

MACHINES



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California

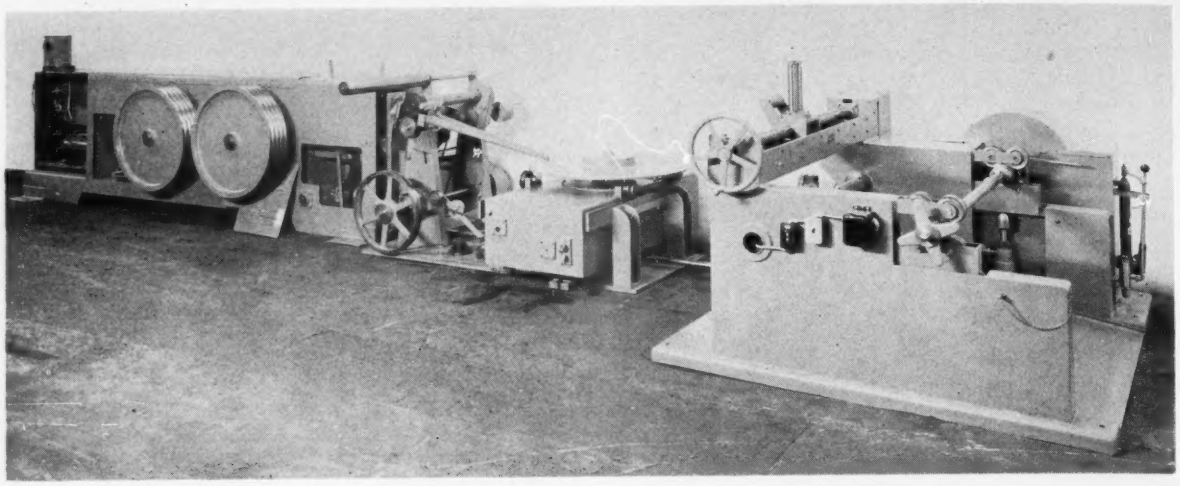
CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne



COMBINATION WIRE PANNING MACHINE, DRUM TAKE-UP AND DOUBLE CAPSTAN WITH ADJUSTABLE SPEED DRIVE.

DRIVE EQUIPPED WITH CLUTCH SO EITHER DRUM TAKE-UP OR PANNER CAN BE THROWN IN OR OUT OF OPERATION.

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

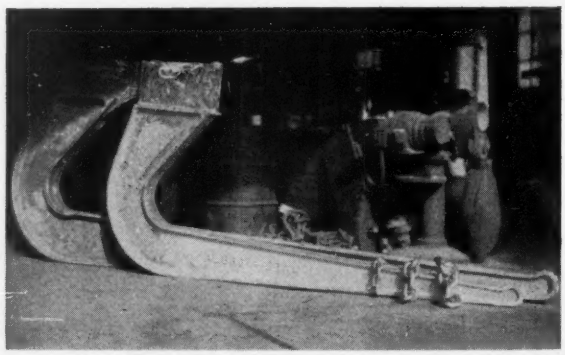
PHILADELPHIA 33 PENNSYLVANIA U.S.A.

Use "ALBRO" METAL

HAIRPIN HOOKS *and other* PICKLING EQUIPMENT *for economy*

THEY LAST!

1. We specialize in the manufacture of pickling equipment.
2. Our engineers are at your service to help you on pickling problems.
3. We build equipment to your specifications.
4. Send us your drawings and let us quote.
5. Write, wire or telephone.



Other "ALBRO" METAL products are:
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ALBRO METAL

BRONZE DIE CASTING CO.

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Roland R. Preston

Roland R. Preston, 454 Meridian Drive, Pittsburgh 34, Pennsylvania and Die Sales Engineer in the Pittsburgh office of **Carboloy Department of General Electric Company,** died at his home on Wednesday, March 5th, after a short illness.

* * *

Mr. Preston was born in Ferrisburg, Vermont on February 17, 1888. He attended Goddard Seminary in Barre, Vermont.

* * *

In 1908 he became associated with Page Steel and Wire Company in Monessen, Pennsylvania. He rose in this organization to Superintendent of the Wire Mill.

* * *

He resigned this position in 1941 to become Die Sales Engineer in the Pittsburgh office of Carboloy Company, Inc., a position he held until his death.

* * *

Mr. Preston was a well known figure in the wire industry for 20 years. He was a specialist in the drawing of high carbon wires. He was a member of the Wire Association.

* * *

Personnel Changes at Aetna-Standard

The Aetna-Standard Engineering Company, Pittsburgh, Pa., announces appointment of **W. J. Langacher** as Chief Engineer and **G. E. Mandry** as Assistant Chief Engineer of the Pipe and Tube Division. Mr. Langacher succeeds **Perry J. Snyder,** who has resigned to accept a position with **Youngstown Sheet & Tube Company.**

* * *

Langacher has been with Aetna-Standard for many years and has held several engineering positions covering Aetna's major product lines of Pipe and Tube, Flat-Rolled and Drawbenches. Active in engineering societies, he served as Chairman of the Youngstown Section of The American Society of Professional Engineers for 1950-51.

* * *

Mandry has also seen long-time service with the company. His most recent assignment was Project Engineer.

J. L. Whitten Made General Manager of Lee Wilson Engineering Company

J. L. Whitten, vice president and sales manager, has been given the additional duties of general manager of **Lee Wilson Engineering Co. Inc.,** Cleveland. He has been with the company 14 years. **V. L. Miller,** associated with the company for six years, and previously in charge of research and development, is now chief engineer. He succeeds **H. H. Armstrong,** resigned. **W. R. Watt,** for the last year assistant to the president, has also been made production manager.

Made Plant Industrial Engineer by Crucible Steel

James M. Walton was recently appointed plant industrial engineer, Midland Works, **Crucible Steel Co. of America,** Midland, Pa. For the last 12 years he was with the Homestead district works of U. S. Steel Co.

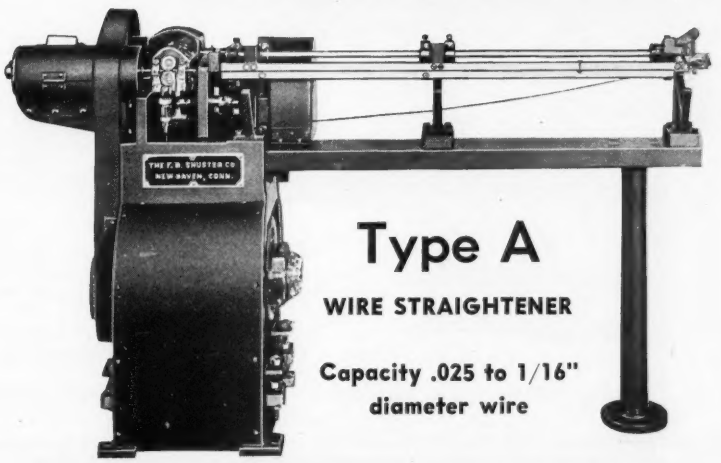
★ ★ ★

Elected Director of National Screw

Donn D. Greenshields was elected a director of **National Screw & Mfg. Co.,** Cleveland. He has been vice president since 1949.

of course it's a **SHUSTER!**

AUTOMATIC ACCURATE AND ECONOMICAL



Type A

WIRE STRAIGHTENER

Capacity .025 to 1/16" diameter wire

This machine combines every major feature for which Shuster Wire Straighteners are noted. Outstanding advantages are faster feed, a greater cutting speed that delivers undistorted, square-cut ends, and a type of construction that is extremely rigid and wear resisting. Write us for details, now.

Other machines available with capacities up to 11/16" dia.

Mfd. by **METTLER MACHINE TOOL, INC.**

132 W. Lawrence St., New Haven, Conn.

Representatives in all principal cities and in foreign countries.

SHUSTER *Automatic* Since 1866 WIRE STRAIGHTENING AND CUTTING MACHINES

A Review of Recent Wire Patents

No. 2,584,199, SKIRT HANGER, patented February 5, 1952 by Harry Grossman, Cleveland, Ohio.

The hanger comprises a single length of wire, bent to shape.

★ ★ ★

No. 2,584,208, APPARATUS FOR WINDING AND PRODUCING COILS, patented February 5, 1952 by Eric L. Holmgren, Bay City, Mich., assignor to Kuhlman Electric Co., Bay City, Mich.

A pivotally mounted extruder head is provided through which the wire passes during its travel to a coiler form, and a silicone elastomer is fed to the head, whereby a coating of the elastomer will be applied to the wire to fill air voids between the turns of the wire and layers of the transformer coil being formed.

★ ★ ★

No. 2,584,593, APPARATUS FOR CUTTING WIRES IN MAKING WIRE-BOUND BOXES, patented February 5, 1952 by David G. Kingsley, Mountain Lakes, N. J., assignor to Stapling Machines Co., Rockaway, N. J.

The apparatus is for cutting the binding wires between moving box-part units in a box-blank making machine.

★ ★ ★

No. 2,584,692, APPARATUS FOR STRIPPING INSULATION FROM WIRES, patented February 5, 1952 by Edward S. Geary, Nutley, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

By the arrangement disclosed specially formed slots are provided to receive insulated wires of predetermined diameters and the insulations are separated from the wires forced into the slots to strip the insulations from other portions of the wires by relative movement of the wires and the slot-forming elements of the apparatus.

★ ★ ★

No. 2,584,792, MATTRESS CARRIER AND SUPPORT, patented February 5, 1952 by Levi Deen, Alma, Ga.

A mattress airing supporting assembly is provided, comprising a number of interconnected wires bent to shape.

★ ★ ★

No. 2,584,994, NONEMISSIVE ELECTRODE AND METHOD OF MANUFACTURING, patented February 12, 1952 by Kenneth Edward Everett, London, England, assignor to International Standard Electric Corporation, New York, N. Y., a corporation of Delaware.

According to this patent, a grid wire base is coated with zirconium exclusively, with a superficial stratified coating of carbon over the zirconium.

★ ★ ★

No. 2,585,037, INSULATED ELECTRICAL CONDUCTOR, patented February 12, 1952 by Preston Robinson, Williamstown, and Collin C. Reid, Boston, Mass., assignors to Sprague Electric Company, North Adams, Mass., a corporation of Massachusetts.

The assembly comprises a tightly wound coil of wire composed of a metal selected from the group consisting of copper, tin, iron, lead, aluminum, magnesium, chromium, zinc and alloys containing such metals, whose adjacent turns are insulated from each other only by a layer of phthalocyanine salt formed in situ.

★ ★ ★

No. 2,585,422, COLLAPSIBLE BASKET, patented February 12, 1952 by Charles C. Averill, Albion, Mich., assignor to Union Steel Products Company, Albion, Mich.

An elongated tapered collapsible basket is provided consisting of metal rods or wires.

★ ★ ★

No. 2,585,428, CLOTHESBASKET, patented February 12, 1952 by Dewey H. Bitney, Albion, Mich., assignor to Union Steel Products Company, Albion, Mich.

This basket is also composed of wires and rods, some of the wires being flat in transverse cross section.

★ ★ ★

No. 2,585,729, WIRE MESH STRAINER OR THE LIKE, patented February 12, 1952 by Frank Berman, Brookyn, N. Y.

More specifically, the invention resides in menas for finishing and reinforcing the top edge of a bowl-shaped strainer sheet of wire.

★ ★ ★

No. 2,585,994, METHOD OF CONTROLLING COILING MACHINES, patented February 19, 1952 by Wentworth D. Boynton, Woodbrook, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 453 Main St., Stamford, Conn.

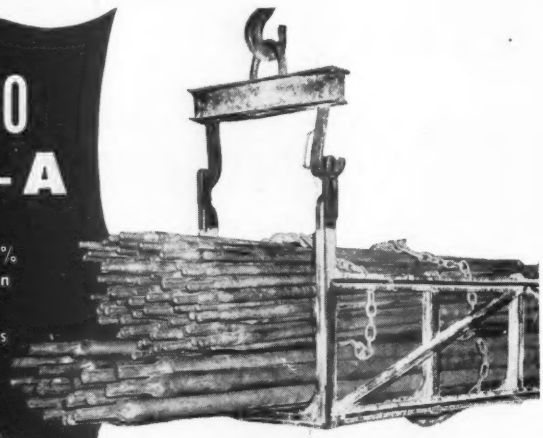
NOPCO 1067-A

★ saves over 30% sulfuric acid solution in pickling of iron, steel and nonferrous metal products

★ aids processing

★ speeds production

★ assures improved output



Add Nopco 1067-A to the pickling bath, and you reduce loss of sulfuric acid solution through carryover to the rinsing tank by 30% to 40%.

Here's a definite economy, of outstanding benefit today when current restrictions limit the use of sulfuric acid.

But Nopco 1067-A not only effects high drainage, it also affords such important advantages as these:

★ ***faster, deeper, and more uniform penetration of oxide scale*—resulting in elimination of pitting, lower metal losses, and smooth, clean surfaces after pickling**

★ ***reduced operating time and lower costs*—since better drain-off means fewer rinsings for complete acid removal**

★ ***reduced acid contamination in operations following pickling*—with the result that tool and die life is increased**

★ ***easier acid disposal*—since acid is localized in first tanks**

In a word, addition of this unique surface tension depressant to your sulfuric acid pickling solutions not only means *money in your pocket*, but more satisfactory products coming off your production line.

LET US TELL YOU ALL ABOUT NOPCO 1067-A. MAIL THE ATTACHED COUPON TODAY.

NOPCO CHEMICAL COMPANY
Harrison, N. J.

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Gentlemen:
Please send me full information about Nopco 1067-A.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

The method is for controlling a motor driven machine for coiling wire to produce coils of uniform length by alternately motor-driving the coiling machine and allowing the machine to coast.

★ ★ ★

No. 2,586,007, WIRE COIL INSERT WITH TAPERED END, patented February 19, 1952 by Harkness W. Cram, Pelham, and John O. Forster, Long Island City, N. Y., assignors, by mesne assignments, to Heli-Coil Corporation, Long Island City, N. Y., a corporation of Delaware.

A method is disclosed for providing a wire coil with a tapered end having its point of taper on its outer circumference.

★ ★ ★

No. 2,586,345, ELECTRIC CABLE HAVING A NONMIGRATORY INSULATING COMPOUND, patented February 19, 1952 by Albert King, London, England, assignor to British Insulated Callender's Cables Limited, London, England, a British Company.

An impregnated paper-insulated electric cable is provided comprising a wire conductor, an intersticed laminated body of paper surrounding the conductor, an impervious sheath surrounding the body, and a normally plastic solid comprising micro-crystalline petroleum wax, having a melting point of at least 80°C., in the interstices of the body and impregnating the paper of which the body is formed.

★ ★ ★

No. 2,587,400, APPARATUS FOR WINDING UP ALTERNATE ROLLS OF LENGTHS OF WELDED WIRE FABRIC, patented February 26, 1952 by William S. Southwick, East Lynn, Mass., assignor to Thomson Electric Welder Company, Lynn, Mass., a corporation of Massachusetts.

So that the cut-off lengths of wire fabric may be routed into different paths for winding up, a pivot plate is provided to deliver the cut fabric alternately in different paths leading to the wind-up rollers.

★ ★ ★

No. 2,587,521. CABLE REINFORCING AND SUPPORTING DEVICE, patented February 26, 1952 by Thomas F. Peterson, Shaker Heights, Ohio.

There is employed a number of resilient elongated reinforcement elements being distributed symmetrically around the stranded wire cable as regarded in right section, each element being helically preformed to constitute a helix surrounding the cable, the helix throughout its length having a preformed inside diameter less than the outside diameter of the stranded cable, and having the pitch and direction of the lay thereof the same as the pitch and direction of the lay of the strands of the cable, whereby these elements extend in frictional contact with adjjacent strands of the cable respectively.

★ ★ ★

Townsend Building Rivet Plant

Townsend Co., New Brighton, Pa., is building a $500,000 plant for its Cherry Rivet Co. Division at Santa Ana, Calif. The fact that as many as a quarter million Cherry rivets are used in building one superbomber indicates how important these rivets are in present-day aircraft construction.

★ ★ ★

Reprint of Wire Drawing Lubricant Article Available

Information for the engineer and the practical man is summarized in "Metal Drawing Lubricants for Wire, Tubing and Sheet Steel".

★ ★ ★

An authoritative study written in semi-technical language, it considers the progress which has been made in the field of drawing lubricants, and valuable tips on the selection and use of the proper lubricants for drawing wire, tubing and sheet steel.

★ ★ ★

Although the article is written from the viewpoint of the wire-drawing man, the principles are general, and apply just as well to drawing tubing and sheet metal. Short sections are devoted to the latter subjects.

★ ★ ★

Reprints are available from **R. H. Miller Co., Inc.,** Homer 2, New York.

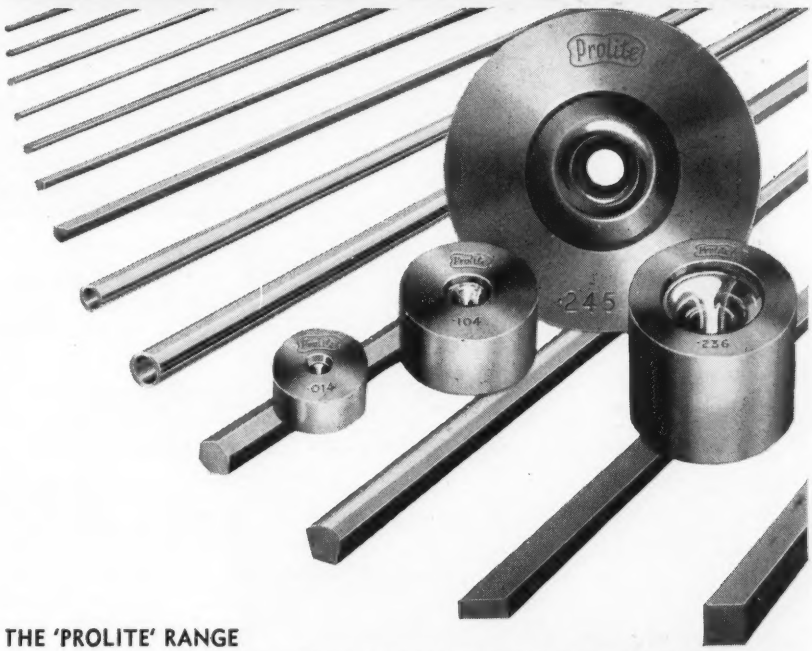
★ ★ ★

Nails Underground

Approximately 35 tons of nails are employed underground each month in International Nickel's underground Canadian mining operations.

Leading British Manufacturers use Prolite DRAWING DIES

CEMENTED TUNGSTEN CARBIDE



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Tungsten Carbide Tips and Tipped Tools, Bar, Tube and Wire Drawing, Extruding and Metal Forming Dies and Die Pellets, Cold Heading Dies, Nozzles, Guides, Bushes and other Wear Resisting Parts.

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WIRE-WORKING MACHINERY

Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

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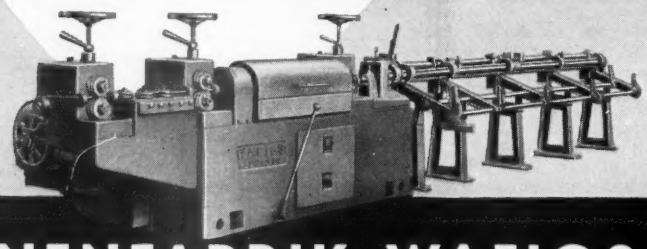

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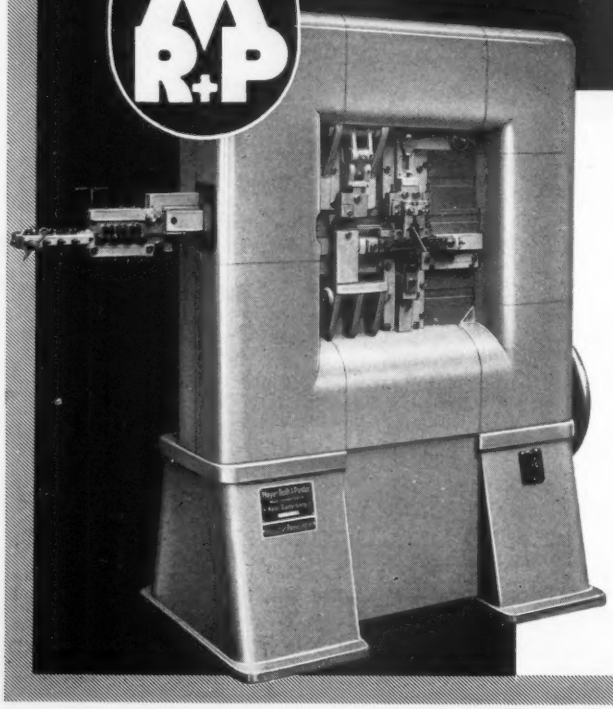
KÖLN-RADERBERG



A new

Universal Multi-Slide Bending Machine

for the full-automatical and economical manufacture of mass-produced articles of all kinds from wire and strip.

Special features:

- Vertical structure, covered construction, smallest space requirements.
- Bending slides positively moved and directly steered, therefore high output and fool-proof operation.
- Exact wire feed by a special steered pressing device.
- Simple shaped tools, easy to supervise, to adjust, and to exchange.
- Possibility to use further slides for unusual bending shapes.
- Additional equipment for stamping, punching, and piercing.

Please enquire for our detailed catalogue-sheet which will inform you about working ranges and employments of our Multi-Slide Bending Automatics.

Solar's New Saturant and Finisher Particularly Developed for Building Wire with Glass Braid

A new saturant and finisher were recently developed and perfected for use on building wire with glass braid by **Solar Compounds Corporation** of Linden, New Jersey, a leading manufacturer of coatings, compounds and varnishes for electric wire and cable, paints for industrial use and protective coatings for paper.

★ ★ ★

These new Solar compounds, and a Solar Soldura color solution which is used for polarity identification and as an antistick, provide the wire with a smooth, neither sticky nor gritty, surface which is tough enough to withstand tight coiling without chipping, flaking or peeling off. Specially compounded for use over glass braids, the saturant and finisher permanently bond the individual fibers and set new standards for resistance to heat, fire, rot and moisture.

★ ★ ★

Composed of processed asphalts combined with other ingredients particularly chosen for their low susceptibility to temperature changes, the new saturating compound, identified as Solarite KS-566, will remain flexible indefinitely when it is applied under recommended, controlled conditions. It has some flame resistance, but must be used with a flame-retardant finisher to meet Underwriters' Laboratories Standards. Moisture resistance is excellent. Solarite KS-566 Saturating Compound will retain its flexibility at temperatures as low as 0°F., and on the other hand, will not cause sticking in coils up to 140°F. when it is used with recommended finishing compounds and anti-stick coatings. The estimated coverage is 50 per cent of the weight of the glass.

★ ★ ★

The finishing compound used on the new wire with glass braid, identified as Solarite KF-561, is composed of a blend of oxidized petroleum asphalts which were particularly chosen for their low susceptibility. Efficient flame retarding ingredients are chemically combined. Flexibility will be retained when applied as recommended. Solarite KF-561 Finishing Compound was designed to meet Underwriters' Laboratories flame resistance standards in addition to their moisture resistance requirements when it is applied over saturated braids. When used with saturants recommended specifically for cold bend resistance, the finished wire may be bent around the same sized mandrels used in the moisture tests without flaking at 0°C. Solarite KS-566 is a recommended saturant. Other saturants may, however, be employed depending upon the conditions to be met. Mica or paint should be used as an antistick for resistance to high temperatures. One more important point is that this finishing compound will not discolor properly formulated color solutions.

★ ★ ★

For further information on Solar's KS-566 Saturating Compound, KF-561 Finishing Compound or the Soldura color solution, write to Solar Compounds Corporation, 1207 West Blancke Street, Linden, New Jersey.

Ready with quality soaps for every wire drawing need. Whatever your specialized need, you can always find the right soap in Swift's complete line. And you'll find that Swift's Soaps for wire drawing uses have efficient lubrication, minimum dusting and dependable uniform quality.

Willing to apply our knowledge of soap to your lubrication problems.

And Able to give fast service from Swift distribution points coast to coast! You can order any of these fine soaps and expect immediate delivery:

Powdered White Ribbon Guaranteed Powder
Snap Heavy Duty Wire Drawing Powder No. 282
No. 559 Powdered Soap

Plus other special formulations to meet your specifications. See your local telephone directory for address of your nearest Swift office.

SWIFT & COMPANY
Soap Department, Chicago 9, Illinois

Call SWIFT first for soaps

New Wire Take-Up Mechanism Offered by Standard Machinery Company

An entirely new take-up unit for electrical wire and cable manufacture has been designed and built by the **Standard Machinery Company**, Mystic, Connecticut.

★ ★ ★

Called the Davis-Standard Take-Up, the machine has several revolutionary new features, which are said to overcome many of the difficulties which have plagued the wire industry for many years.

★ ★ ★

The new take-up has no gears or clutches, and is built to operate smoothly at high production speeds. The reel drive is by double V-belts, with a brake which automatically stops the reel as it is disengaged.

★ ★ ★

The traverse mechanism is of entirely new design, air-actuated and positive in operation. The reels are shifted in and out of engagement by air pressure and the reel is shifted to floor level to overcome the danger of damage by dropping.

★ ★ ★

A choice of speed change methods for constant tension control is provided, as well as an efficient dancer control column. The Davis-Standard take-up is built in sizes to take reels from 6″ to 36″, and larger sizes can be furnished on special orders. The construction of the machine is rugged and insures dependable service in 24-hour-a-day operation.

★ ★ ★

A notable feature of the machine is a lack of noise and vibration, which has always been a disadvantage with old style take-ups. The reel arbor is removable and adaptation can be made for use of coiling heads if desired. Automatic cut-over also is available.

★ ★ ★

New Mill Type Portable Bolt Cutter With Reversible Jaws Gives Double Blade Life, Unbreakable Handles

The Manco Manufacturing Company announces the development of their new Model 30-MCC Mill Type Bolt Cutter. Manufacturer claims this new cutter gives approximately double blade life. The feature which makes this longer life possible is an innovation in design which permits the cutting blade to be reversed—the blades themselves being roughly similar to a double edge safety razor blade. Blades may be readily resharpened when necessary. The steel handles are drop forged and will not break.

★ ★ ★

Capacity of Manco Model 30-MCC cutter is ½-inch diameter bolts or ⅜-inch diameter steel rod. Eccentric head strap and fulcrum bolts maintain tension for easier action. Completely streamlined adjusting sections require one wrench for quick adjustment. Handle assembly, cutter head assembly and jaws by pair are interchangeable with Standard 30-inch bolt cutters.

★ ★ ★

For additional information write to the Manco Manufacturing Company, Bradley, Illinois.

★ ★ ★

Wire Drawing Machines, working on the dry and wet method (soap powder and by immersion), for iron, steel, copper, aluminum and other metal wires.

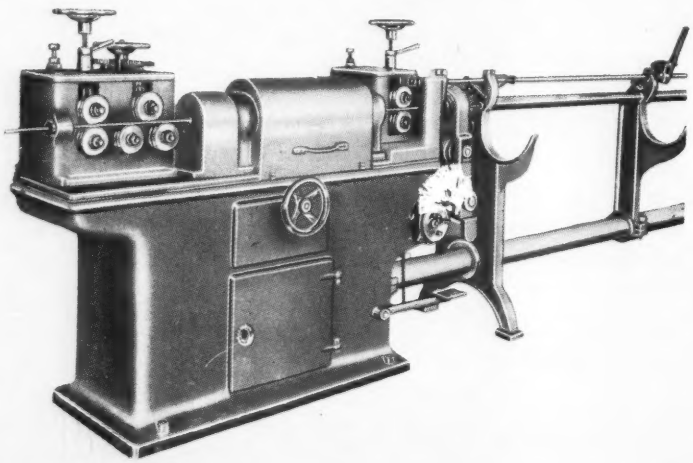
EW

Metal Wire Cloth Weaving Looms (fly-& mosquito nets, sieves, plastering work).

Automatic Straightening and Cutting Machines.

Machines for producing:

Wire nails and wire tacks, rivets, iron & wood screws, small nuts, welded and non-welded chains, knotted chains, barbed wire, wire pins, safety pins, hair clips, spokes and nipples for bicycles, etc. etc.



EMILIO WARTENWEILER

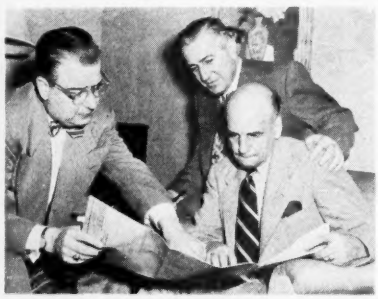
MILANO (Italy) Via G. B. Pergolesi, 18

Preview of New Coating Research Laboratory Highlights Industrial Ovens' Sales Meeting

Sales representatives for Europe, South America, Canada and the United States were afforded a preview of **Industrial Ovens'** new laboratory for research and development in the coating field during the company's annual sales convention in Cleveland, February 17-19.

★ ★ ★

Policies and methods which will be put into effect so that the various



Left to right, C. A. Litzler, Pres., Industrial Ovens; A. H. Kruger, IOI's Chicago representative; and E. V. Larson, their Canadian representative.

industries served by IOI will derive maximum benefit from the new laboratory facilities were outlined by **C. A. Litzler,** president, and **J. K. Gillett,** sales manager.

★ ★ ★

The group also heard **H. L. Bullock,** consulting engineer of Bullock-Smith Associates, New York City, speak on the subject "Trends in the Coating Industry." Other topics covered during the three-day session included recent IOI developments in vinyl coating machinery, tire fabric processing systems, nylon hot stretch systems, pressure senstive tape and mechanical goods machines.

★ ★ ★

Representatives in attendance at the sessions included: **J. P. Clark,** Philadelphia; **A. H. Kruger,** Chicago; **E. V. Larson,** Canada; **V. C. Leatherby,** Pittsburgh; **A. N. Mason,** New York; **Fernando Leon,** Castellvi, Inc., New York, South American Representative; **R. Binder,** Gillespie & Co., New York, European Representative; **E. R. Talone,** Washington.

★ ★ ★

Youngstown S & T Announces a Television Program

The manufacture of small sized pipe at the Campbell plant of **The Youngstown Sheet and Tube Company** is being shown on television programs after Sunday, March 2.

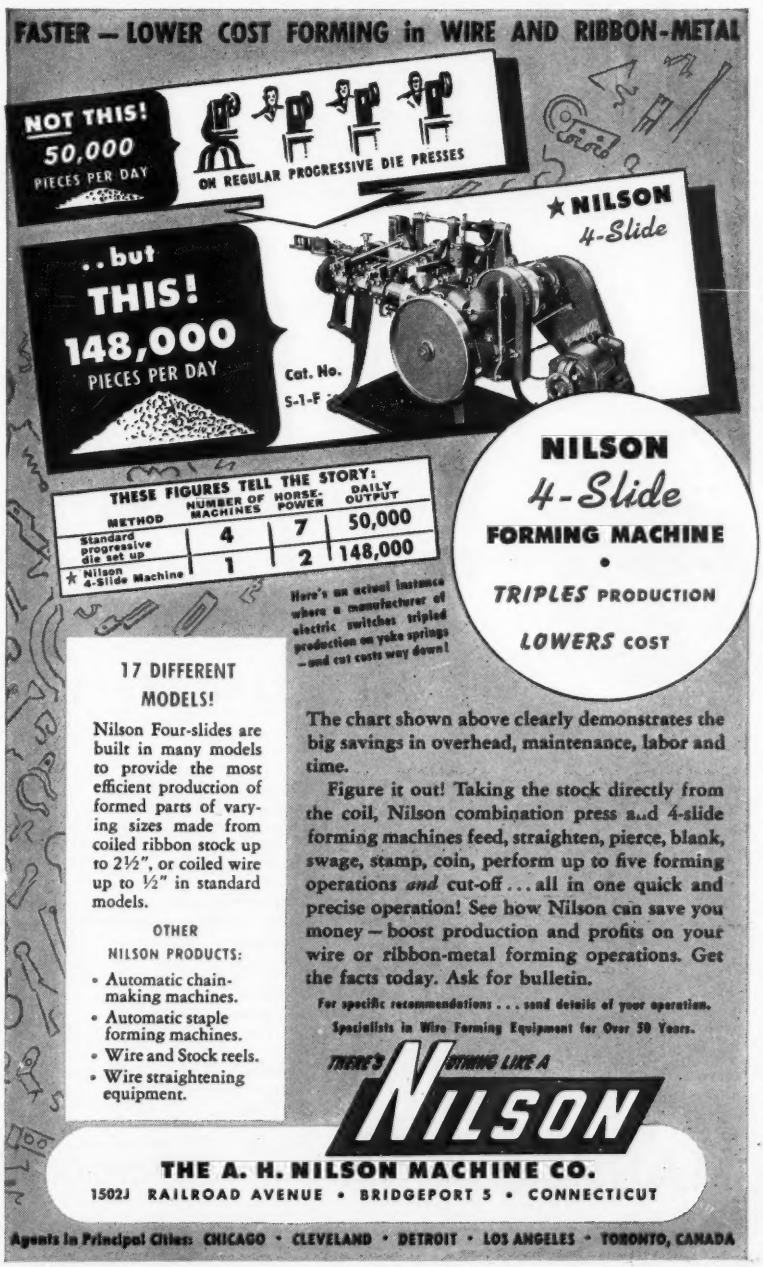
★ ★ ★

The pictures are included in Reel No. 72 of "Industry on Parade", released by the National Association of Manufacturers. They show how coils of skelp are welded together, the skelp fed into furnaces and heated 2300 degrees, and how the skelp is formed into pipe and cut into lengths.

★ ★ ★

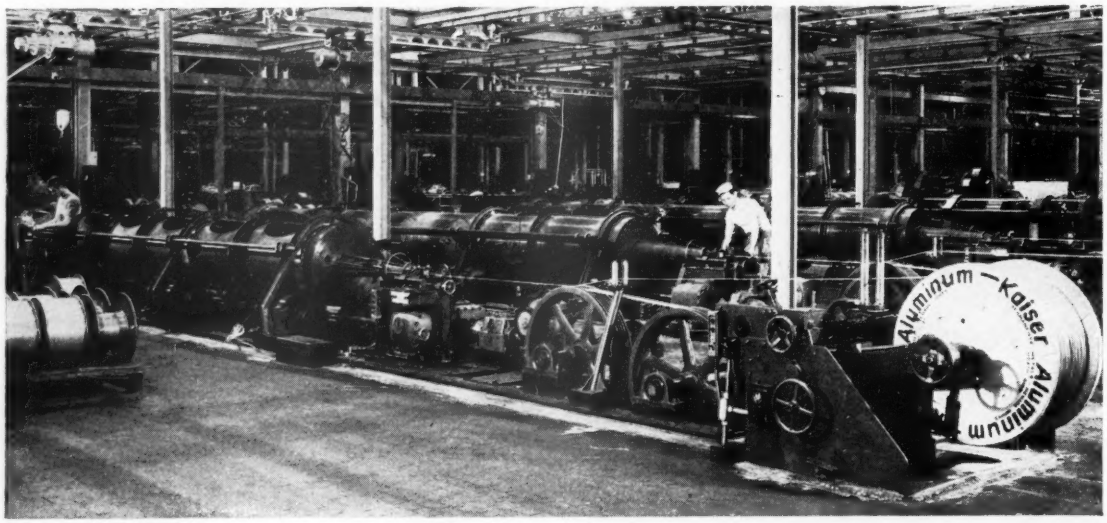
Also shown in the film are scenes from the Columbia Iron and Metal Company scrap yard at Girard, O. Scrap yards in America handle approximately 33,000,000 tons of scrap each year—processing it so it can be used to make new steel.

★ ★ ★


FASTER — LOWER COST FORMING in WIRE AND RIBBON-METAL
NOT THIS!
50,000
PIECES PER DAY
ON REGULAR PROGRESSIVE DIE PRESSES
..but
THIS!
148,000
PIECES PER DAY
★NILSON
4-Slide
Cat. No.
S-1-F
THESE FIGURES TELL THE STORY:
METHOD
NUMBER OF MACHINES
HORSE-POWER
DAILY OUTPUT
Standard progressive die set up
4
7
50,000
★ Nilson 4-Slide Machine
1
2
148,000
Here's an actual instance where a manufacturer of electric switches tripled production on yoke springs — and cut costs way down!
NILSON
4-Slide
FORMING MACHINE
•
TRIPLES PRODUCTION
LOWERS COST
17 DIFFERENT MODELS!
Nilson Four-slides are built in many models to provide the most efficient production of formed parts of varying sizes made from coiled ribbon stock up to 2½", or coiled wire up to ½" in standard models.
OTHER NILSON PRODUCTS:
• Automatic chain-making machines.
• Automatic staple forming machines.
• Wire and Stock reels.
• Wire straightening equipment.
The chart shown above clearly demonstrates the big savings in overhead, maintenance, labor and time.
Figure it out! Taking the stock directly from the coil, Nilson combination press and 4-slide forming machines feed, straighten, pierce, blank, swage, stamp, coin, perform up to five forming operations and cut-off ... all in one quick and precise operation! See how Nilson can save you money — boost production and profits on your wire or ribbon-metal forming operations. Get the facts today. Ask for bulletin.
For specific recommendations . . . send details of your operation.
Specialists in Wire Forming Equipment for Over 50 Years.
THERE'S NOTHING LIKE A NILSON
THE A. H. NILSON MACHINE CO.
1502J RAILROAD AVENUE • BRIDGEPORT 5 • CONNECTICUT
Agents in Principal Cities: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • TORONTO, CANADA

NEW 22" SPOOL 750 RPM TUBULAR STRANDER

HYDRAULIC LIFT REEL STAND — INFINITELY VARIABLE TRAVERSE AIR CONTROLLED
DOUBLE DRUM HAUL-OFF WITH LINK BELT P.I.V. — AIR OPERATED BRAKING SYSTEM



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HUGHESVILLE MACHINE & TOOL COMPANY
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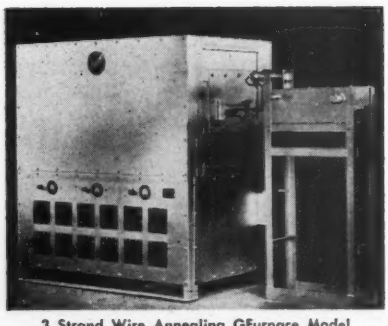
Harper

UNIFORM RESULTS EASILY OBTAINED ON STAINLESS WIRE With HARPER STRAND ANNEALERS



3 Strand Wire Annealing GFurnace Model HOU-5140-NT.

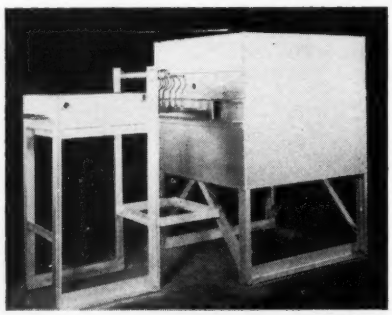
● Harper Electric Wire Annealing Furnaces are available in a variety of sizes to meet present day requirements for research and production annealing of fine gauge stainless steel wire.

Uniform results are easily obtained through extreme temperature uniformity during a slow anneal in a special atmosphere.

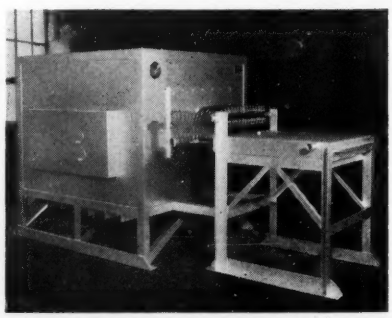
Eliminate furry results and put your stainless wire production on a trouble-free, more economical basis with a Harper Electric Strand Annealer. Our Engineers will be glad to work with you on your furnace requirements. Write today, to:

HARPER ELECTRIC FURNACE CORPORATION

Dept. #12, 39 River Street, Buffalo 2, New York



110 Strand Wire Annealing Furnace Model HOU-10224-NT-28.



30 Strand Wire Annealer Model HOU-30240-NT-28.

Now—Heller Builds a Desk Stapler With Cam-Action (Staples up to 120 sheet pads of paper)

Thick pads of paper can now be stapled as easily as a few sheets with the new desk model stapler introduced by **The Heller Company** of Cleveland, Ohio.

★ ★ ★

This compact yet powerful stapler can stitch booklets, folders, magazines, maps, blueprints, time cards and perform many other fastening jobs.

★ ★ ★

Using the principle of long leverage and combining it with cam-action, this stapler accomplishes heavy work without effort. It is light in weight, takes up very little desk space and has a sure grip rubber-cushioned base that cannot mar the finest finish. Drives flat steel staples 11/64″ to 9/16″ long, that come in long bars and can be loaded from either end of the machine.

★ ★ ★

This Desk Stapler was designed for the office girl's use, and will operate endlessly without attention. Anvil or stitching head is interchangeable and the gate requires no tools to open.

★ ★ ★

Adaptable to many assembly line jobs in the stitching or stapling of paper, plastics and other materials where ease of handling, portability and space are factors.

★ ★ ★

Pennsalt Introduces New Rust Inhibiting Metal Cleaner

Pennsalt EC-51, a new rust-inhibiting organic-type metal cleaner, has been announced by the **Pennsylvania Salt Manufacturing Company.**

★ ★ ★

Newest addition to the Pennsalt line of emulsion cleaners, used by the metal industry for many years, the new product combines powerful detergent action with a high degree of rust protection.

★ ★ ★

Steel parts cleaned in Pennsalt EC-51 obtain protection from rusting for up to six weeks under normal plant conditions. Even under unfavorable conditions, protection for two to three days can be expected.

★ ★ ★

The new cleaner is equally efficient in removing soil from all of the non-ferrous metals without staining or etching. Pennsalt Cleaner EC-51 is used in concentrated or diluted form and can be applied by both spray and immersion methods. It is non-caustic, non-explosive, harmless to the hands and does not create toxic working conditions. It is manufactured at the company's Cornwells Heights, Pa., plant and is packaged in 50-gallon drums.

★ ★ ★

Riverside Metals Moves Clark to Newark

Robert G. Clark, office sales supervisor, **Riverside Metal Co.,** Riverside, N. J., was transferred in February to the company's Newark, N. J., office to assist **F. M. Shelley, Jr.**

precision
wire straightening
and cutting
for all industry...
AIRCRAFT
AUTOMOTIVE
RADIO
TELEVISION
TOYS
COMMUNICATION
TEXTILE
Whenever your wire straightening or cutting problem calls for close tolerances and uniform quality, it will pay you to take advantage of Pittsburgh Cut Wire's long experience to all industry. Expert workmanship and exact machining to your specifications for more than a decade, combine to give you the experience that will serve you best. Call on us for your wire straightening and cutting needs.
Straightening & Cutting in diameter ranges from 1/16" to .005" in all types of wire.
Pittsburgh
cut wire company
1120 Galveston Ave. Pittsburgh 12, Pa

New Model Plastics Extruder Available

The National Rubber Machinery Co., Akron, Ohio, recently announced the availability of its new "Model 50" 2½" Electrically Heated Plastics Extruder.

★ ★ ★

Designed for use in the latest extrusion techniques, the "Model 50" has a number of new features. These include a more convenient control cabinet for left-hand or right-hand operation; a faster operating die adapter gate for quicker die and screen changes; a single, sturdy fabricated steel base for both drive transmission and cylinder; a heavy duty cone gear for greater drive and longer life; and a more compact, streamlined overall design for easier, safer operation.

★ ★ ★

Standard NRM features that have been retained are the hollow bored feed screw of heat treated alloy steel with flame hardened flight surfaces; the unique and positive "Balanced Heat Control"; the water cooled feed hopper, the replaceable Xaloy 396 cylinder liner; and the proportioning type pyrometer controls.

★ ★ ★

Complete accessories such as tachometer, ammeter, and tubing die are also available.

★ ★ ★

"Unmachinable" Metals Now Machined Without Cutting Tools

Metals so hard they cannot be machined by conventional methods, including tungsten carbide, are being shaped by a new electro-mechanical process, **M. F. Judkins,** Chief Engineer for **Firth Sterling Steel & Carbide Corp.,** McKeesport, Pennsylvania, stated in a paper presented before the American Society of Tool Engineers at Detroit in March.

★ ★ ★

In the process, Mr. Judkins said, metal particles are actually "torn" from the workpiece by powerful electrical forces. Electrodes that never touch the work are used instead of cutting tools.

★ ★ ★

The "cutting" action takes place in a liquid. Accuracy of within one thousandth of an inch was claimed for the process by Mr. Judkins, who also stated that accuracy of location of holes produced by the process was equal to that of many conventional machine tools.

★ ★ ★

Threaded holes can also be produced by the process. A ¼ in. diameter threaded hole, for instance, can be cut in carbide at a cost of around $20.00, while a rough drilled and reamed ½ in. diameter hole 2½ in. deep can be produced in the same material in three hours for $30.00.

★ ★ ★

The author said that "cutting" rates of several inches per minute are within the realm of possibility for the process.

★ ★ ★

New Stapling Machine Announced

International Staple and Machine Company, 801 East Herrin St., Herrin, Illinois, announces an automatic model of its retractable anvil carton stapling machine. This model (TH1-HAS), for closing of overlap cartons, is air operated and automatically functions when the operator presses the carton against the stapling head.

Stapling of filled cartons, fibre or corrugated, is done from outside the carton. An important feature of the equipment is that it can be adjusted for concealed stapling. When adjusted in this manner, the staple penetrates approximately two-thirds of the way through the carton wall, and is clinched.

★ ★ ★

Corrugated cartons can be closed quickly and economically and meet full requirements of the Consolidated Freight Classification and have the approval of the Post Office Department.

★ ★ ★

The entire assembly is mounted on a standard size flat top stainless steel table designed to accommodate cartons of various sizes. Operation of the unit requires 60 lbs. per square inch air pressure.

★ ★ ★

Aetna-Standard Buys Rubber and Plastics Division of National-Erie Corporation

E. E. Swartswelter, President of **The Aetna-Standard Engineering Company**, Pittsburgh, Pennsylvania, announces the purchase of the rubber and plastics machinery division of the **National-Erie Corporation**, Erie, Pa., wholly owned subsidiary of Bucyrus-Erie Company.

★ ★ ★

The purchase includes the drawings, patterns and special equipment required in the manufacture of this machinery. Aetna-Standard will manufacture the rubber and plastics machinery products in their Warren, Ohio, Plant. Sales, design engineering and development work will be handled by their associate, Hale & Kullgren, Inc., Akron, Ohio.

★ ★ ★

These are some of the products which will be manufactured: Mills; Washers; Crackers; Sheeters; Refiners; Extruders; Banbury Mixer; Strainers; Insulators; Hydraulic Platen Presses; Vulcanizers; Devulcanizers; Simplex Quick Opening Doors; Laboratory Equipment and Special Machinery to customer's specifications.

★ ★ ★

Aetna-Standard has long been a foremost producer of equipment for steel, copper, brass and aluminum. They are best known for continuous butt weld pipe mills, seamless tube mills, continuous galvanizing and tinning lines, flat-rolled equipment, wire drawing machines and drawbenches. Mr. Swartswelter emphasizes that they will continue primarily as a manufacturer of these products. In fact, the company recently expanded their Ellwood City, Pennsylvania, plant for this purpose. The rubber and plastics line will supplement Aetna-Standard's existing lines of machinery.

★ ★ ★

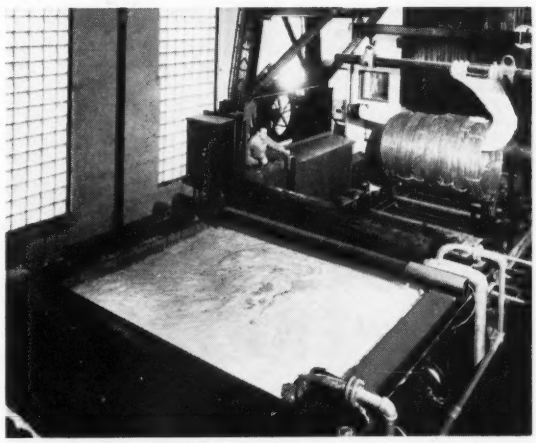
New Screw Thread Standards

A revised edition of the **"American Standard for Screw Thread Gages and Gaging"** has been approved by the American Standards Association, 70 East 45th Street, New York 17, N. Y., price $4.00. It brings up-to-date the methods for checking threaded products to see if they comply with the requirements for Unified and American Screw Threads for Screws, Bolts, Nuts and Other Threaded Parts, B1.1-1949. The Unified Threads were approved in 1949 by Great Britain, Canada, and the United States.

★ ★ ★

To INCREASE Your Pickling Tonnage...

. . . Use HEIL Steam Jet Agitators



A typical wire mill pickler completely outfitted with HEIL E-3 Type Steam Jet Agitators.

The majority of pickling operations throughout this country and Canada have selected Heil Steam Jet Agitators to increase pickling production at lower cost per ton. Violent agitation and proper heating of pickling solution in one simple operation will save valuable itme and money for you, too.

1. **LONGER SERVICE LIFE** The combination of special lead alloy and patented nozzle construction provides rugged construction for longer service life. No breakage from thermal shock.
2. **LOWER INITIAL COST** Standard Pre-engineered units are available to meet your specific requirements. No down-time necessary for installation.

External Shell and Tube Exchangers available for continuous pickling.

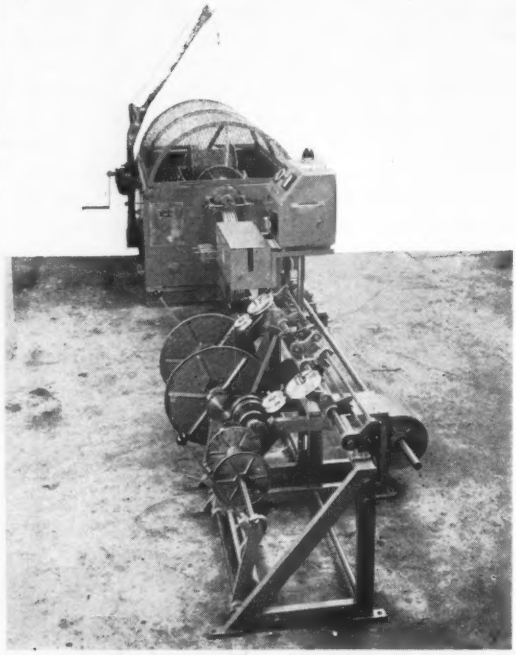
3. **CHOICE OF MATERIALS** Standard units are available in either lead alloy for sulphuric acid or impervious graphite for muriatic and mixed acid solutions.
4. **YOU SAVE ACID** Uniform agitation at higher obtainable temperatures allows you to pickle at lower concentration and thus stretch your acid consumption.

Write for illustrated literature and Bulletin No. 43-W.

Representatives in all Principal Cities

HEIL PROCESS EQUIPMENT CORP. 12901 Elmwood Ave. Cleveland 11, Ohio

Other Heil Products: **Pickling Tanks • Lined Fume Removal Systems • Acid-Proof Maintenance Materials • Syphons • Lined Acid-Proof Piping**



See Our

HORIZONTAL TWINNER

- **HIGHLY PRODUCTIVE**
  - — 800 lays a minute
  - — Large drums :

  Pay-off: 16 & 24" flange diameter
  Take-up: up to 42"
  - — double take-up assembly.
- **SURE**
  - — tension easy to balance
  - — equipped with a sparker device
  - — stopping for a predeterminate length.
- **EASY TO USE**
  - — Lays from 2" to 6"
- **ESPECIALLY EFFICIENT FOR MILITARY TRANSMISSION CABLE.**

POURTIER MACHINES

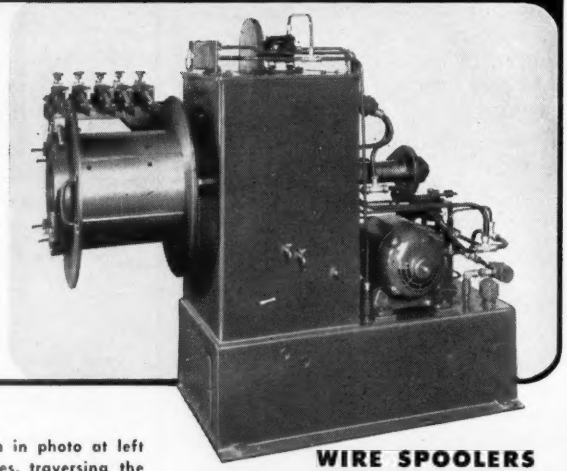
153, rue Galliéni

ROMAINVILLE Seine (FRANCE)

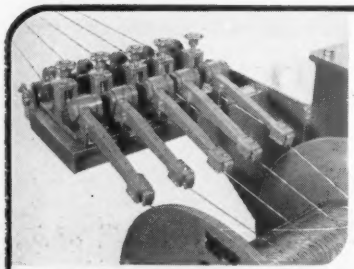
COIL 5 STRANDS IN 1 OPERATION

SECO TRAVERSE REEL SPEEDS UP PRODUCTION

This new SECO Traverse Reel winds five separate coils of flat wire or narrow strip *at the same time.* Coils are oscillated-wound, permitting much longer lengths than conventional ribbon-wound coils. Smooth, powerful hydraulic operation gives coiling speeds as high as desired, accurately controlled from zero to top running speed.



WIRE SPOOLERS
Single and Multiple type. Speeds up to 4,000 feet per minute.



Method of coiling is shown in photo at left The complete block oscillates, traversing the wire into five 3" wide coils. Traverse and tension control are extremely accurate. 1/8" to 1/2" wide flat wire can be wound. Block has 16" inside diameter and 24" outside diameter.

Call or Write for Information and Complete Data — No Obligation

STEEL EQUIPMENT CO.
P. O. Box 737, Warrensville Station, Cleveland 22, Ohio

SECO

Atlantic Steel to Build New Warehouse

Atlantic Steel Company will construct a new half-million dollar warehouse and office building at the corner of Northside Drive and 14th Street for its warehouse division, it was announced by Robert S. Lynch, president of the company.

★ ★ ★

The primary reason for constructing the new building at the present time, according to Mr. Lynch, is that existing warehousing facilities of the division will be needed to accommodate the increased production to result from Atlantic Steel Company's new electric furnace which is expected to be in operation soon.

★ ★ ★

The structure will have 67,200 square feet of warehouse and facilities space and 6,700 square feet of air-conditioned office space. It will be located on a nine acre tract now being graded. The building will be 45 feet high.

★ ★ ★

The structure is so designed that three railway cars at a time may be loaded or unloaded in the building's interior. Dock loading facilities will accommodate seven large trucks.

★ ★ ★

In addition to warehousing steel products for distribution throughout seven Southeastern states, the division will offer shearing, flame-cutting, sketch plate burning and hack saw cutting equipment facilities to metal fabricators and users.

★ ★ ★

Atlantic Steel Company established its warehouse division in 1947. It is operated separately from the steel mill itself and buys products from Atlantic Steel in much the same manner as other customers of the company.

★ ★ ★

In conjunction with the regular steel warehouse products and services, this division also handles a complete line of industrial and residential fencing, and playground equipment.

★ ★ ★

The Institute of Metals: Awards of Medals

The Council of the Institute of Metals, London, England, has made the following awards of medals for 1952.

★ ★ ★

The Institute of Metals Medal to **William Stanley Robinson**, until recently President of the Consolidated Zinc Corporation, Ltd., in recognition of his outstanding services to the non-ferrous metal industries in developing the Australian zinc-lead industry and the British zinc industry.

★ ★ ★

The Rosenhain Medal to Professor **André Guinier**, Conservatoire National des Arts et Métiers, Paris, in recognition of his outstanding contributions in the field of physical metallurgy, particularly in connection with precipitation phenomena.

★ ★ ★

The W.H.A. Robertson Medal to **Cyril Ernest Davies**, for his paper on "The Cold-Rolling of Non-Ferrous Metals in Sheet and Strip Form", published in the **Journal**, 1951, vol. **78**, pp. 501-536.

★ ★ ★

Standardize on ACROPAK* Spools!

Only ½ the Weight!

YET STRON , TOUGH, RIGID . . LONGER LIFE

ACROPAK Spools will help you cut wire packaging costs because they give longer service, require less maintenance and cost less to ship. They're strong. They'll take repeated shippings and still run true on the arbor. They're machined to close tolerances. You can run them at high production speeds with fewer snags, less toe-out and minimum end breakage. When reconditioning is finally needed, you can do it faster, easier and at less cost with special fixtures we supply.

Light Weight
Precision built
Reduced cost
Longer life
Extra strength
Dynamic balance
Greater production
Low cost reconditioning
Less maintenance
Attractive packaging

THEY CUT YOUR SPOOLING COSTS

Best proof of ACROPAK superior performance are the millions of these spools now used by the biggest names in the wire industry. We've proved it to them—let us prove it to YOU.

Write for information

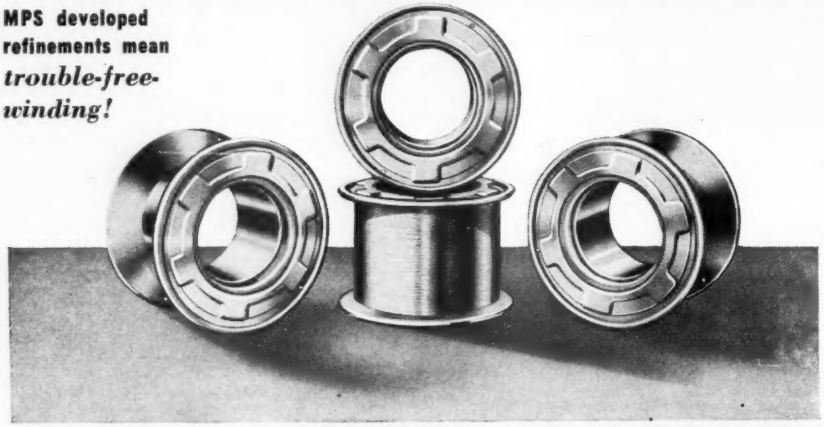
ACROMETAL PRODUCTS INC.
Division U. S. Bobbin and Shuttle Co., 616 Fifth Street N., Minneapolis 1, Minn.

Spool Headaches Eliminated

when MPS. HEAVY DUTY NO-CREV SPOOLS

are used in the drawing of the finest wire at high speed

MPS developed refinements mean *trouble-free-winding!*



SIZES

*6	x	3½	x 3½
6	x	6	x 3½
6½	x	3½	x 3½
6½	x	6	x 3½
8	x	6	x 4½
8	x	8½	x 4½

and others

* Illustrated

MOSSBERG PRESSED STEEL CORP.

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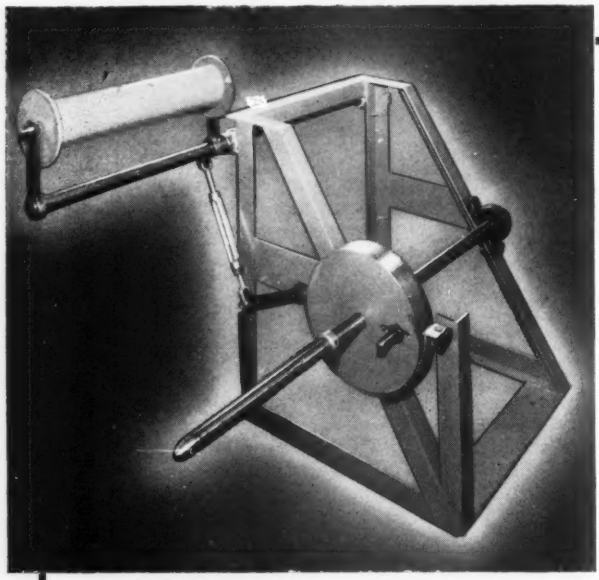
James Day (Machinery), Ltd., 28 Maddox Street, London, W. I. England — # 104



FEDERAL PAY-OFF...

for Re-Spooling

This rugged and well-made Pay-Off can be equipped with an air or electric brake, if desired, for use with your re-spooler and spark tester. Has 34" wire level that will be found convenient in re-spooling operations.

And they're priced reasonably!

Send for full information.

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DOUBLE TAKEUPS
TAKE-UPS
CAPSTANS AND
PAY-OFFS

Federal Manufacturing Co.

SPECIAL WIRE MACHINERY

236-240 Hall Avenue, Wallingford, Conn.

New Southern Fiberglas Plant in Full Operation

Volume production in the new Fiberglas textile yarn plant at Anderson, South Carolina—world's largest, most modern and fully equipped of its kind— will assure considerably greater supplies of the material during 1952.

★ ★ ★

The Fiberglas yarns made at Anderson, augmenting those being produced in other Owens-Corning Fiberglas Corporation plants at Ashton, R. I., and Huntingdon, Pa., will help fulfill greatly increased demands for the material in both military and defense-supporting civilian applications.

★ ★ ★

Under allocation since the step-up in America's defense production, Fiberglas yarns are used widely as an electrical insulation base material; to reinforce plastics, industrial papers and tapes and mechanical rubber products; in vinyl- and rubber-coated fabrics, and for decorative curtains and draperies.

★ ★ ★

In addition to its Fiberglas textile yarns plants in Anderson, Ashton and Huntingdon, Owens-Corning produces Fiberglas insulating materials, air filters and mat products at plants in Newark, O.; Kansas City, Kans., and Santa Clara, Calif. General offices are in Toledo, O., and headquarters of the Textile Products Division in New York City.

★ ★ ★

Anderson's Fiberglas yarn plant is of single-story brick and insulated steel panel construction and has 265,400 square feet of floor space. It is situated on a 134-acre plot on State Highway 81, four miles south of Anderson.

★ ★ ★

The new plant was designed and built for maximum efficiency, with continuous, one-level operations. The plant proper—covering production, service, shop and warehouse areas—is near-square in shape, with a notched-out southeast corner. It is 430 feet wide by 450 feet deep, with the 90-foot-square notched area for truck loading.

★ ★ ★

Inside the New Fiberglas Yarn Plant as a preliminary production step is receipt of selected silica sand, limestone and other mineral ingredients. These raw materials are stored and mixed. After mixing, they move in cars on a monorail conveyor from the batch house across a steel bridge into the huge furnace hall.

★ ★ ★

Here, the mineral ingredients are melted into glass. Subsequently, molten glass flows down through tiny apertures of bushings or feeders and the tiny streams are mechanically attenuated at high speed into exceedingly fine glass filaments. The filaments are gathered on winding mechanisms and groups of filaments then go to fabricating departments for subsequent twisting, plying and other processing into various Fiberglas yarn products.

★ ★ ★

The plant also has laboratories for analyzing raw materials and glass batches, maintaining quality control standards and checking physical properties of finished materials.

anneal wire the MODERN way!

You'll save money, you'll improve efficiency along many lines with the unique Ajax Electric Salt Bath wire annealing method. It requires less floor space, less labor, less maintenance. Heating cycles average less than 20 minutes, even on difficult jobs. There is no scaling, no decarburization, no explosion hazard, none of the bothersome problems entailed with atmosphere equipment. Salt bath treating does the work faster, better, cheaper!

Ideal for annealing low- or high-carbon and stainless steel wire and rod; annealing aluminum, and copper and silver alloys; and for descaling stainless and alloy steel wire in molten salt baths.

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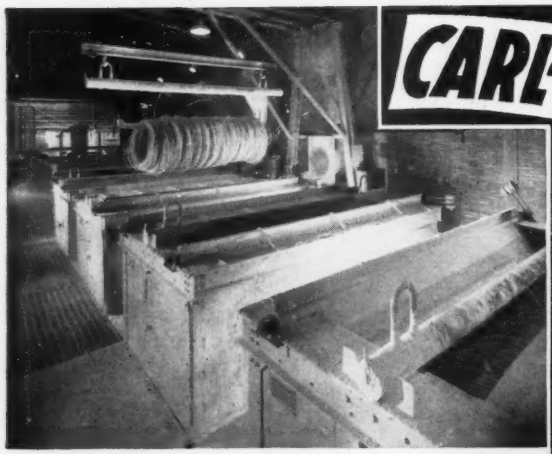
Frankford and Delaware Aves. • Phila. 23, Pa.
The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively

WRITE FOR YOUR COPY!
This 72-page Ajax booklet tells the entire story of salt bath heat treatment as applied throughout modern industry. Ask for Booklet **116A.**

AJAX HULTGREN ELECTRIC SALT BATH FURNACE



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ROD BAKERS

PATENT Nos. U.S.A. 2,235,559 2,296,361 2,323,828 CANADA 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy — and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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Atlantic Wire Co.
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Canadian Steel Corporation.
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Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
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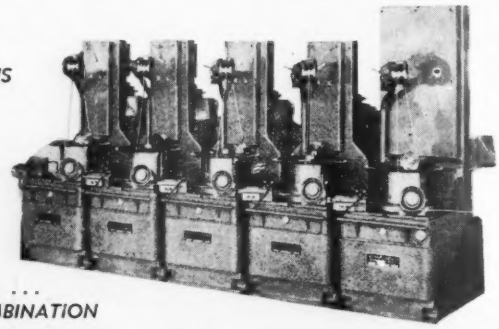
THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

AETNA-STANDARD WIRE DRAWING UNIT

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

FERROUS OR NON-FERROUS



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SINGLE UNIT ... OR ANY COMBINATION

THE AETNA-STANDARD ENGINEERING CO.

PITTSBURGH, PA.

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND
AETNA-STANDARD ENGINEERING COMPANY, LTD. . . . TORONTO, ONTARIO, CANADA

Widely-Used Safety Hammer Embodies New Construction Feature

A new and improved type of construction within the hammer head has just been announced by the **Custanite Corporation** of Larchmont, New York, manufacturers of the CUSTANITE Flex-Flo SAFETY HAMMER.

★ ★ ★

Using an entirely new principle—"Controlled Compression" — the "Flex-Flo" construction (patent pending) consists of a malleable metal hammer having hollow chambers, the inner walls of which are corrugated. Under continuous heavy pounding, the opposing angles of these corrugations slowly approximate each other at a predetermined rate, thus retarding the compression of the malleable hammer head, and preventing mushrooming.

★ ★ ★

The CUSTANITE Flex-Flo SAFETY HAMMER is made of a special analytically controlled non-ferrous copper-base alloy. It won't spark, chip or flake and has a high degree of tensility. Since no metal is lost, the hammer retains its original balance and weight.

★ ★ ★

The manufacturer states—"Results of a number of comparative tests show conclusively that the Custanite Safety Hammer will outlast ordinary soft hammers made of rawhide, plastic, rubber or metal up to 12 times or more."

★ ★ ★

The CUSTANITE Flex-Flo SAFETY HAMMER is available in six convenient weights and sizes: ¾ lbs., 1½ lbs., 2¼ lbs., 3 lbs., 4½ lbs., and 6 lbs. Prices and other information can be obtained by writing to the manufacturer.

★ ★ ★

New Tough Plastic Announced by Naugatuck Chemical

Development of a new thermoplastic molding and extrusion compound which will retain its toughness and high impact strength at temperatures as low as —60°F. was announced recently by **Naugatuck Chemical Division,** United States Rubber Company.

★ ★ ★

The new material, known as Kralastic J, is a styrene copolymer. Its initial uses are expected to be primarily military applications where a plastic with low temperature toughness is required. Possible applications include military equipment for Arctic use and for aircraft which reach low temperatures at high altitudes.

★ ★ ★

Detrex Advances Two in Engineering Department

The appointment of **John Nuber** as Assistant Chief Engineer and **Stewart Millar** as Supervisor of Engineering Standards and Development has been announced by **T. J. Kearney,** Chief Engineer of **Detrex Corporation,** Detroit 32, Michigan.

★ ★ ★

Mr. Nuber will be in charge of all technical phases of design and estimating for the company's industrial process cleaning division, which includes the solvent-vapor degreasers and alkali washer equipment.

★ ★ ★

Mr. Millar, a graduate of the University of Detroit Engineering College, previously served with Detrex in the capacity of Field Service Engineer. His new duties as Supervisor of Standards and Developments will concern him with design improvement of present industrial cleaning equipment, together with continuous study of ways and means of improving the design of accessory equipment for Detrex metal cleaning machines.

★ ★ ★

Firth Sterling Adds to Staff

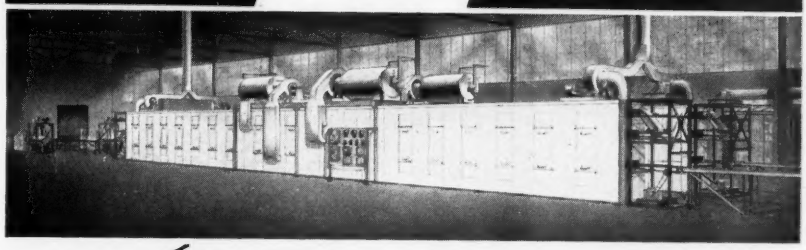
Raymond J. Zale has been appointed Sales Metallurgist for the **Firth Sterling Steel & Carbide Corporation.** He was formerly employed by Lindberg Steel Treating Co. as Plant Metallurgist and Assistant Plant Manager of their Rochester Division. Following this he was the New York State Sales Representative for Darwin & Milner, Inc.

★ ★ ★

Mr. Zale graduated from Michigan College of Mining and Technology where he received his B. S. in Metallurgical Engineering. He is a member of the American Society for Metals, the American Society of Tool Engineers, and the Rochester Engineering Society.

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

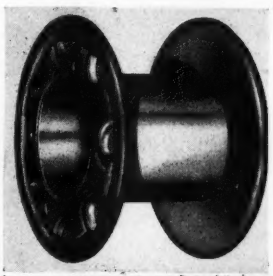
Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

WRITE FOR BULLETIN NO. 350

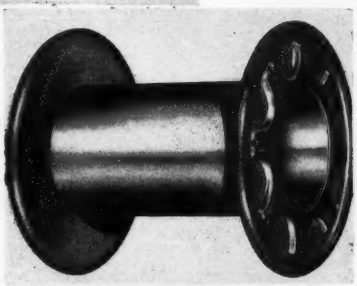
THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO



whatever your spool requirement may be . . . .

HUBBARD HAS IT



FOR EXAMPLE . . . if you require process spools, perhaps Hubbard Steel Process Spools will meet your need exactly. They provide extreme rigidity, are accurately balanced, and are built in all standard sizes for wire drawing and processing.

Whatever your requirements may be, remember Hubbard.

Write for information and prices.

HUBBARD SPOOL COMPANY

Garrett, Indiana

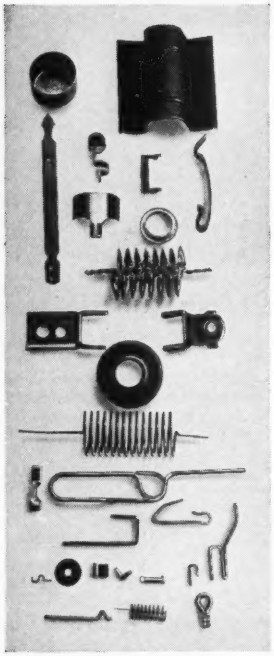
Phone: GARRETT 840

STEEL SPOOLS AND REELS . . . METAL BOUND SPOOLS AND REELS . . . STEEL TRAVERSES . . . LIGHT WEIGHT REELS . . . WOOD REELS

Hubbard

Priced Right!

WIRE FORMS & Metal Stampings



High-speed, quality production with custom-made precision. Wire formed in any shape for every need.

IMMEDIATE CAPACITY FOR DEFENSE SUB-CONTRACTS

STRAIGHTENING & CUTTING
Perfect straight lengths to 12 ft.
.0015 to .125 diameter

WIRE FORMS
.0015 to .080 diameter

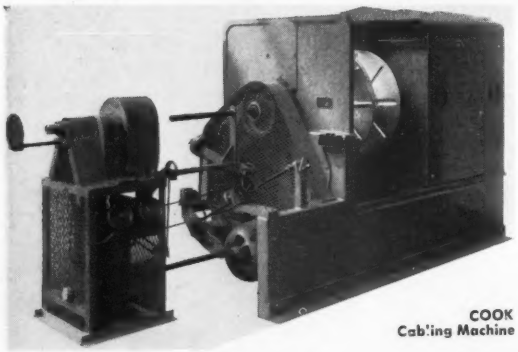
SMALL METAL STAMPINGS
.0025 to .035 thickness
.062 to 3 inches wide

Specializing in Production of Parts for Electronic and Cathode Ray Tubes

Write for illustrated folder.
Send Blueprints or Samples for Estimate.

ART WIRE and STAMPING COMPANY
2 BOYDEN PLACE
NEWARK 2, N. J.

HIGH SPEED CABLING MACHINE



COOK Cabling Machine

800 twists per minute.
36" Reel maximum.
Wrapping Head and Back Twister Available.
1" to 9" Lay; Up to ¾" Diameter Cable.
Now used for SPIRAL-4.

OTHER COOK EQUIPMENT

- Wire Drawing Machines
- Bunchers
- Twisters
- Cabling Machines
- Spoolers
- Wrapping Machines
- Enameling Take-Ups and Pay-Offs
- Enameling Ovens
- Wire String-up Machines
- Tinning Take-Ups and Pay-Offs
- Tinning Pots
- Special Machinery

COOK MANUFACTURING COMPANY
265 North 9th Street — Paterson 2, N. J.

Bulletin Describes High-Speed Thread Rolling Machine

Rolling three times more threads per hour at cost savings of 65% is reported by users of the new Prutton "Rollmaster", manufactured by **D. H. Prutton Machinery Company**, 5295 West 130th Street, Cleveland, Ohio, according to the machine's designer, and company president, D. H. Prutton.

★ ★ ★

First to incorporate the efficient "planetary" principle, the "Rollmaster" is said to introduce many unique engineering features for high-speed thread rolling in a wide variety of metals ranging from nonferrous to hardened and stainless steels. The machine produces class 3 fit threads at 18,000 to 20,000 pieces per hour, including setup time, and that 5,000,000 pieces can be expected from a set of dies.

★ ★ ★

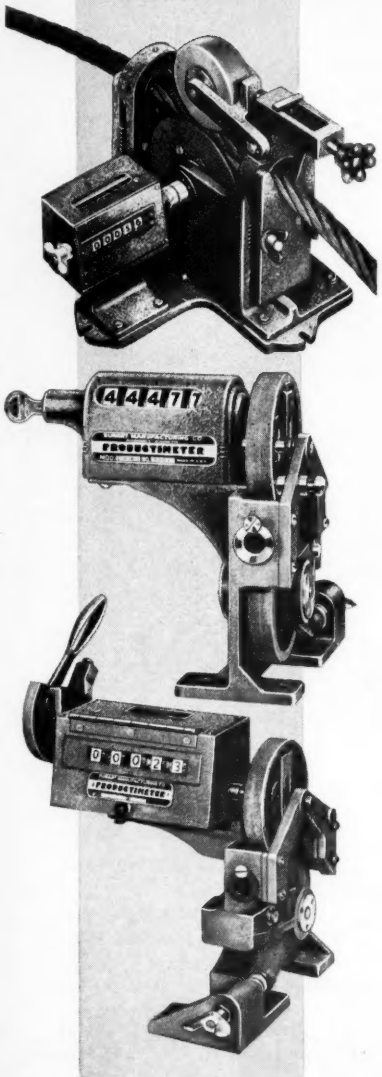
The company also manufactures a high-speed, three-spindle tapping machine of unique design known as the "Tapmaster". Both machines are available in several models for a wide range of work diameters. Bulletins will be sent on request.

★ ★ ★

Atmospheric Durability of Steels Containing Nickel and Copper—Additional Exposure Data

An 8 page pamphlet, including 8 tables and charts, that review recent data and literature on the effect of nickel on atmospheric corrosion in low alloy high strength steels. Observations are based on some specimens after 22 years. Comparisons of results are made for moderate and heavy industrial, marine and rural atmospheres. Beneficial effects of varying nickel and copper and other alloying elements are discussed. Long continued tests show that it is more significant to compare steels on the basis of how long a time is required to arrive at a given unit weight loss than to compare them on the basis of weight loss suffered in a fixed period of time. A prior paper was published in 1940 based on a 15 year test. Copies of this earlier pamphlet are also available. For copies, write to **International Nickel**, Dept. EZ, New York 5, N. Y.

PRODUCTIMETER
WIRE MEASURING MACHINES
Fast . . Accurate . . Dependable . . Legible



Productimeters measure all types of wire from .010 to 1½ inches in diameter . . . at speeds up to 5,000 feet per minute. They eliminate "guess-work". . . insure profitable operation in your plant.

Send for Catalog No. 40

DURANT MFG. CO.
1918 N. Buffum St. Milwaukee 1, Wis.
118 Orange St. Providence 3, R. I.
Representatives in Principal Cities

PRODUCTIMETERS
SINCE 1879 *Count Everything*

Reynolds Publishes Literature and Movie Index

Reynolds Metals Company has published a new index listing technical literature and motion pictures available to people in the metalworking industry.

★ ★ ★

Technical literature is listed under five different headings, covering: Design; Fabrication; Application; Products; and General Information . . . . all having to do with how to use aluminum most effectively.

★ ★ ★

In addition, 7 motion pictures especially prepared for the metalworking industry are listed. These are all on 16 millimeter, most of them in sound and full color.

★ ★ ★

The index will be sent to anyone upon request without charge, by addressing Reynolds Metals Company, Desk "A", 2500 South Third Street, Louisville, Kentucky.

★ ★ ★

New Treatment Eliminates Hard Water Scale Problems

This new water treatment process and equipment called "Hydrotron" eliminates scale in heat exchange equipment by changing water electro-physically, so that minerals contained in the water crystallize out in the form of a sludge or slurry and do not form a dense hard coating over heat exchange surfaces. The sludge formed can be removed by the usual methods of blowdown. This process is suitable for treatment of fresh water or salt water.

★ ★ ★

The Hydrotron process eliminates the need for a water softener or chemicals for the control of hard water scale in boilers, evaporators, condensers, bottle washers, hot water supply systems, air conditioning equipment, or in any equipment where mineral scale forms due to hard water. The process is particularly well-adapted to control scale in once-through systems, such as hot water supply systems or cooling water systems where chemicals or water softeners are not practical or the cost of such treatment is prohibitive.

S. A. ETECO

ZWEVEGEM
(BELGIUM)

Selling Office for
Tréfileries León Bekaert,
S.P.R.L.

STEEL WIRES

IF YOU REQUIRE

NO CMP REQUIRED

Submit your
SPECIFICATIONS
To The
REPRESENTATIVES:

J. GERBER & CO., INC.
855 Avenue of Americas
NEW YORK 1, N. Y.

SAVE TIN!

with

STANNOUS SULFATE

Use of Stannous Sulfate for liquor finishing baths saves tin, assures more efficient processing.

for **ALL LIQUOR FINISHING of STEEL WIRE**

white or straw color

M & T Stannous Sulfate provides these advantages:

- **Reduces tin losses by eliminating the high tin sludging common to the acidulated feather tin process.**
- **Makes it easier to control results because only two variables (the Stannous Sulfate and Copper Sulfate concentrations), require watching.**
- **Produces smooth, uniform, wire coatings from day to day and from lot to lot.**

Write for engineering data on the use of Stannous Sulfate in liquor finishing operations.

METAL & THERMIT CORPORATION
Specialists in Tin and Tin Chemicals
100 East 42nd Street • New York 17, N. Y.

The Hydrotron equipment consists of a bronze pipe unit, installed in the water supply line, and an electrical control unit, which is mounted in a convenient position nearby. The entire apparatus is of simple, sturdy construction, requiring a minimum of care or attention in operation. There are no anodes to replace. The unit has unlimited life expectancy. Operation cost is only a few cents per month. The initial cost of the equipment is moderate, being less than that of a softener of comparable capacity. Simple instructions for installation and operation are supplied and a typical Hydrotron installation can be made in a few hours.

★ ★ ★

For further information, write **Heller Laboratories,** 196 Morgan Street, Jersey City 2, N. J.

★ ★ ★

Made Manager Chicago Operations by A.S.&W.

Nelson W. Dempsey has been appointed manager of operations of the Chicago District of **American Steel & Wire, Walter F. Munford,** vice president has announced. Mr. Dempsey succeeds to the position formerly held by John R. Gaut, deceased.

★ ★ ★

Mr. Dempsey is a native of Stoneham, Mass., having been born there on November 7, 1894. He received his education in the public schools of that community before attending Tufts College at Medford, Mass., from which institution he was graduated with a B. S. degree in chemistry.

★ ★ ★

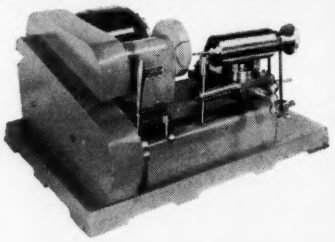
Mr. Dempsey's first association with American Steel & Wire was in May, 1917 when he started work as a laboratorian in the physical laboratory at South Works in Worcester, Mass. He was transferred to Cleveland in October, 1920 as an instructor in the education bureau and subsequent served in the same capacity at Pittsburgh. He continued to progress through the ranks until in February, 1943 he was named assistant to the superintendent at North Works in Worcester. In February, 1944 he was transferred to Waukegan, Ill. as superintendent at that plant's wire division

ROOS DYKREX

MACHINE CORRECTS AND REJUVENATES YOUR

DIES

to original condition



IT'S MORE than a POLISHER

IT'S MORE than a LAPPER or RIPPER

It corrects the die by straightening out any eccentric entrance angles on the dies.

Roos Tool & Mfg. Division
Dykrex Corporation
33-35 Bloomfield Avenue
Newark 4, N. J.

Distributed by
Eastern Carbide Corp., New Rochelle, N. Y.
Carboloy Co. — Detroit — Pittsburgh — Newark — and all Principal Cities.
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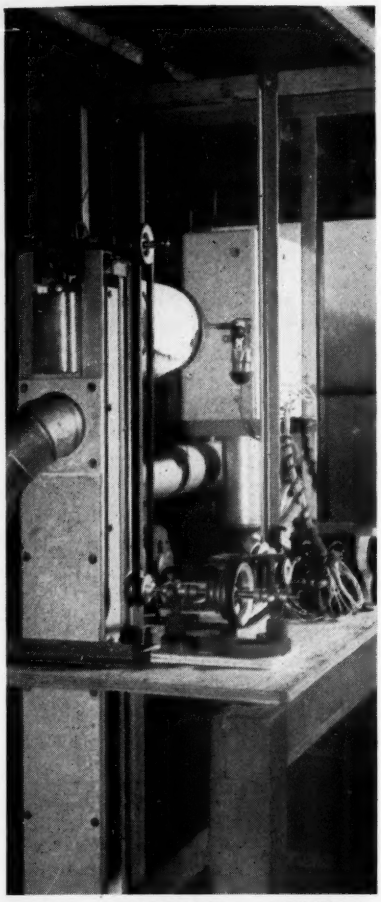


THIS LACQUER TOWER OPERATES LIKE YOURS!

It may not look like the equipment in your plant, yet this pilot lacquer tower duplicates your own lacquering operations.

It is used in the research laboratories of New England Lacquer to test thoroughly all formulated lacquers under actual on-the-job conditions. This and other modern research facilities enable us to formulate lacquers which satisfy your most rigid requirements.

Let our research facilities solve *your* lacquer problems. Write today!

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

and in January, 1948 he was promoted to the post of general superintendent of that plant. In September, 1950 he was transferred to Cleveland as general superintendent of Cuyahoga Works, a post which he held until December, 1951, when he was appointed assistant manager of operations in the Chicago District, which duties he now relinquishes to assume his new position.

"Aging" of Metal Parts Cuts Accuracy of Precision Machines

Even if a precision machine doesn't 'wear out' it can be rendered useless for making modern tools because the metal parts of which it is made change their shape with age.

★ ★ ★

This fact was brought to the attention of industry production experts attending a technical meeting in March, sponsored by the American Society of Tool Engineers in Detroit.

★ ★ ★

F. C. Victory, Chief Engineer of the **Moore Special Tool Company, Inc.,** Bridgeport, Connecticut, said that metal parts can grow, shrink or distort with age, thus decreasing the accuracy built into the machine. The cause of these aging factors is relaxation of internal locked-in stresses and gradual change in the crystalline structure.

★ ★ ★

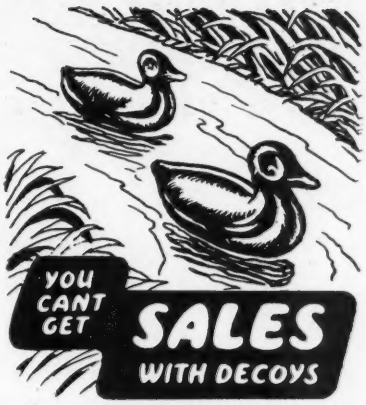
As a case in point, Mr. Victory described a high quality gage block that grew 50 millionths of an inch in a few months at the National Bureau of Standards. He also told of a lead screw 16 in. long which grew 1½ thousandths of an inch in a year and shortly afterward shrunk by half that amount.

★ ★ ★

The only cure, it was brought out, is the application of heat treatment techniques that will relieve stresses in the parts before they are machined.

★ ★ ★

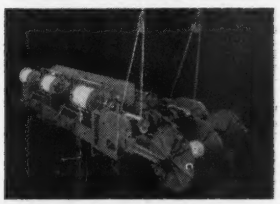
Consistent accuracy required of today's precision machines has led to the heating of some components to a constant temperature to avoid change in dimensions resulting from changes in room or operating temperature.



You can't *afford* to attract customers with "decoys." YOUR problem to is *keep* those customers you get . . . to sell them again and again. To produce—and sell—merchandise that reflects the utmost value, requires correctly engineered plant equipment . . . machinery designed especially to your specific needs for economical production. This is the kind of machinery that Haskell-Dawes designs and builds for varied twisting processes.

To cut the cost of producing rope, thread, cordage and wire, H-D engineering experts constantly work to improve—and still further improve—the efficiency of all Haskell-Dawes machines.

YOU CAN PROFIT BY WRITING NOW
FOR NEW TECHNICAL BULLETINS



We have in preparation an entirely new series of technical bulletins. They describe and illustrate the various machines we manufacture, their application, and important features. These bulletins may point the way to product-improvement and manufacturing economies. Whether or not you are immediately ready to install new equipment, these bulletins are worthy of serious study. Tell us what you are making and an appropriate bulletin will be sent to you as soon as it is available. Write us today.

HASKELL-DAWES
MACHINE CO., INC.
2231 E. Ontario St., Philadelphia 34, Pa.

Here's a Good Tip For Better Lubricating Film . . . Use

BORAX

• More and more, smart wire mills are switching to a BORAX solution for coating wire-stock surfaces before drawing. They choose BORAX because the residual film it produces stays tight, yet pliable, and is an excellent vehicle for the drawing lubricant. A BORAX solution coats steel wire with just ONE DIP . . . film dries quickly in just a few minutes.

Here Are The Advantages of Borax-Coated Stock:

- **Compatible with drawing lubricant.**
- **Cleaner to handle in transit.**
- **Remains in better condition . . .** *an adequate supply can be stored for weeks without reconditioning.*
- **No cleaning of ends necessary before electric butt welding.**
- **Rust inhibited . . . no oxide film forms.**
- **Can be cleaned most easily.**

WRITE FOR FULL INFORMATION

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS 20 MULE TEAM PACKAGE PRODUCTS

Otis Made Vice President of Lear, Inc.

George K. Otis has been elected a vice-president, **Lear, Inc.**, Grand Rapids, Mich. He will continue as general manager of the LearCal Div., at Los Angeles.

★ ★ ★

Durant Manufacturing Company Productimeter Plant Expanded

The Durant Manufacturing Company, manufacturers of Productimeter Counting and Measuring Machines has announced the enlargement of their three-story plant on North Buffum Street, Milwaukee, Wisconsin. A new addition completed in February of this year adds 16,000 square feet to provide space for new offices and plant production.

★ ★ ★

A pioneer in counter design and manufacture, this company had its beginning in 1879 when **W. N. Durant,** an employee of the Milwaukee Rolling Mills, developed a flat case counter to count filled bags of flour. He built up a promising business through the 80's and 90's, which was acquired by new owners upon Mr. Durant's moving West.

★ ★ ★

The present factory site was purchased in 1918. The development and manufacture of various types of counting devices was greatly furthered by World War I. Throughout the years the improvement and re-design of old products have continued along with the development of new counters to keep pace with industrial expansion and the need for greater productivity.

★ ★ ★

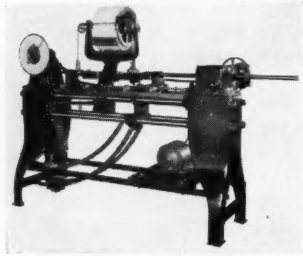
Today, Productimeter Counting and Measuring Machines comprise over 300 standard models for all types of industrial applications, as well as special adaptations for the growing electronic field of manufacture.

TESTED IS TRUSTED — *Justify the Quality of your wires—*

SCOTT WIRE TESTERS

J

Model J, capacities up to 500 lbs. tensile. Results are shown as "picturized" charts, invaluable for production control and reference.



Model Q, capacity 2,000 lbs. Heavy duty machine for tensile testing on a production basis.

Q

Request Catalog 50

SCOTT TESTERS, INC. 55 Blackstone St. Providence, R. I.

Scott Testers — Standard of the World

Expansion in sales engineering services accompanies the increased manufacturing facilities. Within the past few months new representatives have been appointed on the West Coast: **James C. Hale Company,** San Francisco; **Paul J. Short,** at Portland, Oregon; **A. W. Nash Company,** Los Angeles. In the East, **Bernard J. Glista** covers the state of Connecticut. In the South, **William E. Brice Company,** Houston, covers Texas. The Chicago Branch Office sales personnel has been increased to two with the appointment of **Edward C. Carlson** as Chicago District Manager. A new warehouse and repair department have been established in Greenville, South Carolina, under the management of **H. V. Barker,** to facilitate deliveries and services in the southern area. The Eastern Division at Providence, Rhode Island, under the management of **L. A. Nourie,** continues to service the seaboard states.

★ ★ ★

Standard Wire & Cable to Represent Division Lead on Coast

The Standard Wire & Cable Company, has been appointed West Coast sales representative for the Division Lead Company of Chicago, it was recently announced by I. M. Harris, executive partner of the Standard firm.

★ ★ ★

The Standard Wire & Cable will enable West Coast customers to receive speedier delivery on such Divco products as solder, fluxes, lead, tin, alloys, anodes and industrial chemicals. Standard will also provide technical advisory service on the best use of Divco products for any customer desiring it.

★ ★ ★

Supreme Wire & Cable Opens New Plant

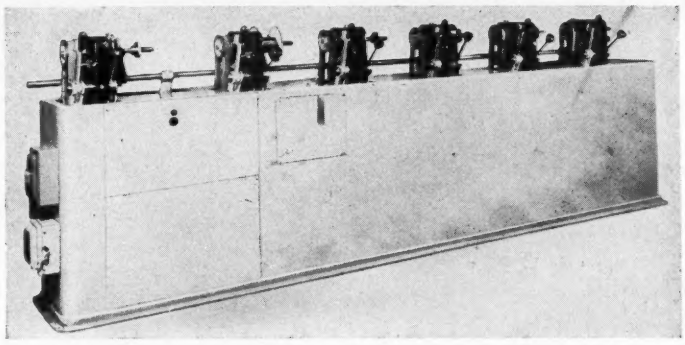
Supreme Wire & Cable Inc. have announced the opening of their enlarged offices, plant and showroom at **1370 Ralph Avenue, Brooklyn 12, N. Y.**

★ ★ ★

The company manufactures a variety of plastic cords, radio and television wires, and coaxial cable.

★ ★ ★

Henry Lilling is President of the company.



NO. 1900K MULTIPLE SPINDLE SPOOLER

This spooler is outstanding for its many unusual and desirable features.

Takes spools up to 16" flange diameter. Enclosed types, with mechanism readily accessible from rear side. Spindles mounted on ball bearings and each may be stopped or started individually. Uses Worthington All-Speed Drive unit.

All Emory Spoolers supplied standard or equipped to meet customers' special specifications.

On Spooling problems, consult

ROBERT J. EMORY COMPANY

31 EAST RUNYON STREET NEWARK 5, NEW JERSEY

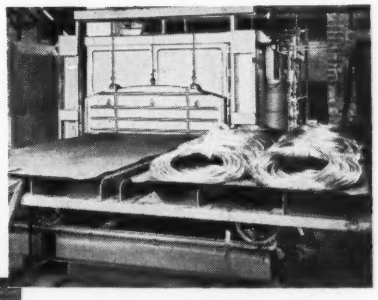
ROCKWELL FURNACES

Gas · Oil · Electric

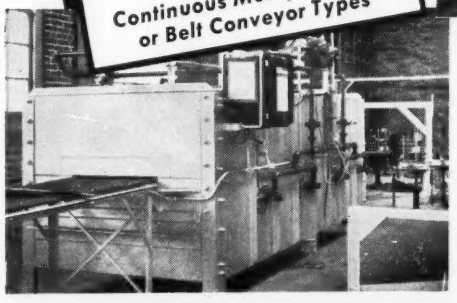
Direct·Muffle·Atmosphere

Batch Pan—Car—Pit or Hood Types

Continuous Multiple Strand or Belt Conveyor Types



Gas-fired, atmosphere controlled, pan type batch furnace for annealing brass wire in coils.



Gas-fired furnace for bright annealing steel, stainless steel and non-ferrous wire running continuously through tubes in furnace.

ROCKWELL ALSO BUILDS { *Coil winding machines, reels and spools; pickling, brushing, cleaning, washing, finishing, drying and handling equipment; ovens and dryers; special fabrications; non-ferrous rod mills.*

ROCKWELL SINCE 1888 BUILT

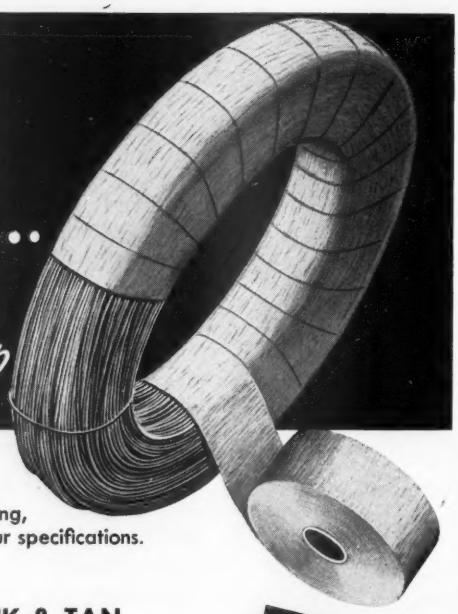
FURNACES · OVENS · SPECIAL MACHINERY

W. S. ROCKWELL COMPANY

242 ELIOT STREET • FAIRFIELD, CONN.

In Canada: Francis Hankin & Co., Ltd. Montreal & Toronto

for TIGHTER ALL-ROUND PROTECTION... use NATCO Spiral Wrap



Strong, with a built-in stretch, NATCO's contour-hugging spiral wrap is superior for wire coils, tubing, metal rods and bars. Made to your specifications.

- PLAIN • WAXED
- WATERPROOF • BLACK & TAN
- GREASEPROOF • REINFORCED
- ANY SIZE ROLL—*for machine or hand-wrapping*

Write today for sample rolls, prices and complete information.

If you use a coil wrapping machine, we can supply special tension and edge-folding attachments.

NATIONAL WATERPROOF PAPERS, INC.

Manufacturers of Protective Papers, Liners and Bags Since 1903

108 Beckett Street, Camden 3, N. J.

NORBIDE® Abrasive: *Effective, Economical*

NORBIDE Abrasive, made of Norton Boron Carbide, is second only to the diamond in hardness — *but 150 times less expensive!* It will effectively cut and semi-finish wire drawing dies, particularly those made of the hard cemented carbides.

Write for Catalog No. 559-W

NORTON COMPANY
Worcester 6, Mass.

NORTON *Making better products to make other products better*

Layton Moved to Los Angeles by Fiberglas

Paul L. Layton has been appointed Fiberglas textile sales representative to cover California, Nevada, New Mexico, Utah, and lower Idaho, it has been announced by **Lou R. Kessler,** vice president and general manager of the **Pacific Coast Division, Owens-Corning Fiberglas Corporation.**

★ ★ ★

His new headquarters will be in the Fiberglas branch sales office, 3445 West Eighth Street, Los Angeles. Mr. Layton will work under William H. Curtiss, Jr., textile sales manager of the Fiberglas Pacific Coast Division, with responsibilities for developing new commercial applications for Fiberglas textile materials in reinforcing plastics, paper, gypsum, rubber, and other industrial materials.

★ ★ ★

Mr. Layton comes to his new post from New York where he had been Technical Assistant to the Fiberglas Textile Sales Manager. He had been responsible for coordinating activities of Fiberglas sales and technical personnel with those of manufacturer-customers.

★ ★ ★

A member of the Fiberglas organization since 1941, Mr. Layton started in a production capacity in the company's Newark, Ohio, plant, where he subsequently spent three years in charge of Fiberglas textile process and products development in the Works Laboratory. Later, he had charge of technical field service for Fiberglas Electrical Sales.

★ ★ ★

Gets Big Cable Contract

Phelps Dodge Copper Products Corporation has been awarded the contract to manufacture a 230,000 volt pipe-type power cable for The Bonneville Power Administration, U. S. Department of the Interior.

★ ★ ★

This cable will be used for prototype tests at Vancouver, Wash., in preparation for the eventual installation of a 24,000 foot submarine power cable. It will reach across Puget Sound linking Snohomish Substation with Olympic Peninsula. Scheduled for construction in 1954, the four and one-half mile submar-

ine cable would cross Puget Sound north of Seattle at depths exceeding 600 feet, to bring approximately 200,000 kilowatts of power to the peninsula area.

★ ★ ★

The plans for the actual installation of the cable call for the welding of the pipe into a single continuous length on shore, then floating it into position and sinking it. The cable will be buried in the extremely shallow portions of the crossing and on the shore ends of the crossing.

★ ★ ★

When the pipe is in position and the shore terminating installations are complete, the cable will be pulled through the pipe. This pipe will be filled with oil under a pressure of 200 pounds per square inch before the line is energized. A permanent terminating plant will be built at one end of the cable to house the control equipment necessary for installation and maintenance of the cable.

★ ★ ★

International Mechanical Engineering Congress

This congress, to be held in Stockholm, Sweden, from June 4th through the 10th is the fourth of its kind to be held. There will be plant visits, exhibits of machinery and industrial products and technical sessions on steels, alloy steels, light alloys, powder metallurgy, non-ferrous metals, plastics, and so forth.

★ ★ ★

Those desiring to attend should secure information from **C. de Novar,** Permanent Secretary, Congress Committee, Sveriges Mekanforbund, Stockholm 16, Sweden.

★ ★ ★

Korb-Pettit Affiliated With Hewitt-Robbins

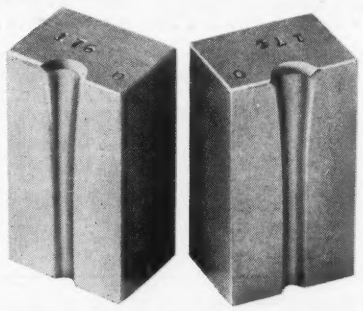
H. M. Ross, manager, has announced that, effective March 1, 1952, **Korb-Pettit Wire Fabrics and Iron Works, Inc.,** has become a subsidiary of **Hewitt-Robbins, Inc.**

★ ★ ★

Korb-Pettit Wire Fabrics and Iron Works will continue its business along the same lines of endeavor and at the same premises. All active Korb-Pettit employees will remain with the organization.

Sjogren POINTING DIES

SJOGREN Pointing Dies have proven themselves! Made from shock-resisting high grade steel they assure many hours of hard, continuous usage. Fit your swaging machines with these rugged, S & S Pointing Dies, made to order on your specifications, they guarantee you service.



Our Silver 25 1927-1952 Anniversary Year

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD STREET AUBURN MASSACHUSETTS

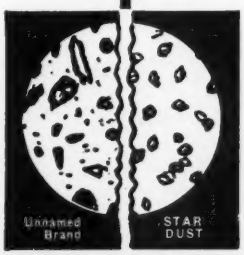
Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

You're LAPS AHEAD with ACE Star Dust

DIAMOND LAPPING COMPOUNDS AND DIAMOND POWDERS

Laboratory Grading Does it!

MIRROR FINISHES IN MINUTES ON DIES, TOOLS, MOLDS AND PRECISION PARTS



ACTUAL MICROPHOTOS PROVE STAR DUST SUPERIORITY AT A GLANCE . . .

STAR DUST is so accurately crushed and graded by Ace's new laboratory method that it achieves uniform nodular shape, permitting all particles to work. Thus you are assured finishes of less than half a micro inch, quicker than ever before. By contrast, note lack of uniformity and the flats in the "unnamed" brand that prevent accurate finishing!

• STAR DUST USERS REPORT AVERAGE SAVINGS IN POLISHING TIME OF MORE THAN 78%: Available in ophthalmic-tipped tubes or in new applicator gun that delivers minimum quantities to individual jobs and eliminates all waste . . . In all grit sizes as fine as .0001".

Delivery from stock in most sizes!

Write today for informative bulletin No. D-4

ACE ABRASIVE LABORATORIES | 250 WEST 57th STREET NEW YORK 19, N. Y.

Cut Your Product Cost...
Stop struggling with wire worries. There's a Continental wire to help cut product costs—to add sales appeal. Let us know about your problem . . Let Continental's helpful wire service work for you.
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STEEL
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WIRE
KOKOMO, IND.

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CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized. KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes

In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum — Annealed — Belt Lacing — Brass, Soft and Spring — Copper, Bare and Tinned Coppered Steel Spring — Galvanized — Tinned
Monel — Nickel Silver — Pure Soft Nickel — Oil tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper — Picture Wire — Iron Wire, Pure — Resistance Wire, Hoskins Chromel "A" — Stainless, Soft and Spring Temper — Tag Wire, 1000 in an Envelope — Florist Wire — Spooled and Coiled, ¼-½-1-5#

Wires Straightened and Cut to length — Small Gauges — Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY

2514 Vestry Ave. Established in 1884 **Cleveland 13, Ohio**

REELS SPOOLS

ALL SIZES

WOOD-PLYWOOD-WOOD-METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

DURKEE MFG. CO. **PINE RIVER, MINN.**

CONSERVE STRATEGIC MATERIALS and SAVE MONEY THROUGH LOWERED COSTS

by buying and using

EASTERN CARBIDE'S TUNGSTEN CARBIDE DIES

They embody many notable improvements; are engineered and designed to give superior performance in drawing wire.

Furnished semi-finished at standard rough-drilled prices. Require only light sizing and polishing.

Let us tell you about them

EASTERN CARBIDE CORPORATION

909 MAIN STREET NEW ROCHELLE, N. Y.

A Memoir on Telford Clarence Batchelor

In a book published by the Courier Press of London, entitled "Telford Clarence Batchelor, A Memoir", T. H. Davies has paid a splendid tribute to his colleagues in the wire rope making world.

★ ★ ★

The memoir was prepared in response to requests by Mr. Batchelor's friends and relatives, by other members of his industry and by a desire on the part of the author to place on record the inventions and achievements of this remarkable man, whose span of life ran from 1857 to 1947.

★ ★ ★

Mr. Batchelor's influence on wire rope design were many, but he is chiefly noted as the inventor, in 1883-4, of locked coil ropes. These were developed subsequently in many different designs of shaped wires, although his genius gave birth to a large number of other types of wire ropes. He was a prolific inventor and many of his patents were extended to other manufacturers through license agreements.

★ ★ ★

The author is to be congratulated for his painstaking work in collecting so complete a record of Mr. Batchelor's contributions to wire rope making which, in a sense, is a history of the development of the art.

★ ★ ★

Marks Golden Anniversary

The Pittsburgh Tool Steel Wire Company, Monaca, Pa., has taken note of its fiftieth anniversary by issuing an appropriate booklet in commemoration of the event.

★ ★ ★

The company began its corporate life on April 3, 1902, with two buildings to house its operations. Today it is occupying eighteen buildings. Beginning with a single grade of carbon steel in 1902, their product list has expanded to cover all grades of tool steels, which in standard items comprises some 1200 sizes, believed to be one of the most complete lines of fine cold finished steels in the country.

The original charter is reproduced, as is a page from their 1902 payroll ledger, in this interesting record of the company's achievements. **Ralph H. Pauley,** who has been president since 1939, heads the company.

★ ★ ★

New Catalog on Cam Milling and Jig Boring

A new catalog has been published by the **Eisler Engineering Co., Inc.,** 750 South 13th St., Newark 3, New Jersey, showing very interesting operations in cam milling and jig boring, and describing their plant facilities. A copy will be sent upon request.

★ ★ ★

New Small Wire Straightener and Cutter

A new machine, the "Minematic" wire straightening machine, is offered by the **Medart Company,** 3535 De Kalb St., St. Louis 18, Mo., for straightening and cutting small wire from .007" to ⅛" in diameter.

★ ★ ★

It is designed on entirely different principles and is said to be simple, economical and to establish new standards for speed and accuracy in both straightening and cutting. Other models, the Supermatic straighteners, are made to handle wire up to 1" in diameter.

★ ★ ★

A folder describing the Minematic machine will be sent by the manufacturers on request.

★ ★ ★

Glass Fibers Opens New York Office

Glass Fibers, Inc., Toledo, Ohio, announce the opening in March of a sales office in the Chrysler Building at 161 East 42nd St., New York 17, N. Y. **Robert V. McCallister,** Branch Sales Engineer, will be in charge. Other offices have been established in Chicago, Los Angeles, Dallas, Detroit and Washington, D. C.

★ ★ ★

Nails in Mining

Approximately 35 tons of nails are employed underground each month in International Nickel's underground Canadian mining operations.

fewer REJECTS — faster PRODUCTION
with Cortland Brand WIRE

There'll be fewer rejects or production stoppages when you use Cortland Brand Wires. From one end to another, these specialized low-carbon wires are noted for their uniform quality. They're made from finest corrosion-resisting steel, drawn in Wickwire Brothers' own mills. Choose Cortland Brand Wires for all your products — in any of these finishes, types and sizes.

FINISH Plain, galvanized, coppered or tinned.

TYPE Stone wire, bookbinder, merchant trade, manufacturers and market, fine and weaving, etc. Coils, spools or straightened and cut to length.

Cortland BRAND
WICKWIRE BROTHERS, INC., Cortland, N.Y.

Buy the Best: MONTGOMERY SILVER-COATED COPPER WIRE

Hard or Annealed—on spools.
Suitable for: Hookup Wire—Radio Frequency Cables—Circuit and High Temperature Wires—as specified by the Armed Services—and others.

WRITE FOR DETAILS
Also makers of Bare Tinsel Conductors
Send for samples and engineering data.

THE MONTGOMERY COMPANY
25 Canal St., Windsor Locks, Conn. Tel.: Windsor Locks 14

WIRE RODS
ALLOY STEEL BARS
TOOL STEELS

FROM
GUSSSTAHLWERK WITTEN A. G.
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Producers of High Quality & Alloy Steels

Send inquiries — specifications to:

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Exclusive U. S. Representatives

WE BUY WE SELL

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2 No. 1 MANVILLE 4-SLIDE MACHINES—Complete

5 PIN-MAKING MACHINES

POWER PRESSES — Assorted Sizes

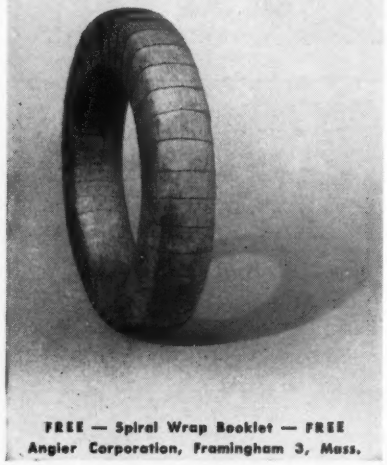
All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

Angier

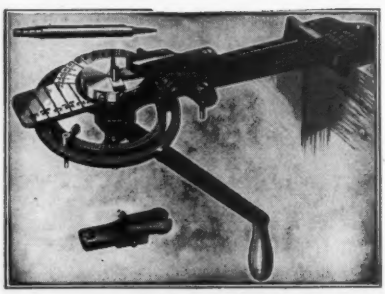
Complete Spiral Wrapping Service

- Creped to s-t-r-e-t-c-h wraps to protect against rust, moisture, oil, or abrasion.
- Proven vapor method that stops rust without slushing . . . Angier VPI ® Wrap.
- Machines, devices for spiral wrapping.
- Installation and service at no charge.



FREE — Spiral Wrap Booklet — FREE
Angier Corporation, Framingham 3, Mass.

KILMER WIRE FORMER



- Forms Eleven Sizes of Eyes from Flat, Round, Square or Half-Round Stock, also Almost Any Shape Desired
- Adjustable for No. 3 to No. 21 Gage Wire

The cut on right shows a few of the thousands of the forms made on this WIRE FORMER

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

Mechanical Descaling of Rods to be Topic Discussed at Pittsburgh

At the Pittsburgh Regional Meeting of The Wire Association, May 8th and 9th at the William Penn Hotel, a symposium on the mechanical descaling of rods will be discussed.

★ ★ ★

This session will consider mechanical methods as opposed to the conventional pickling practices, with the following points considered:

1. Die wear — mechanical versus acid pickled rods.
2. Results of tests with various die designs:
   a. Angles;
   b. Bearing lengths; and
   c. Nib sizes.
3. Results of various maintenance practices.
4. Mechanical tests on wire made from mechanically and acid descaled rods:
   a. Tensile;
   b. Elongation;
   3. Reduction of area;
   d. Torsions; and
   e. Bends.
5. Lubricants for drawing:
   a. Rod breakdown;
   b. Finish Process;
   c. Welded mesh wire;
   d. Nail wire;
   e. Cold heading wire;
   f. Spring wire;
   g. Plating wire; and
   h. Wire for galvanizing.

★ ★ ★

This session promises to be the most interesting and valuable contribution yet offered on the timely subject of mechanical descaling. For full details of the program, see announcement on page 367 of this issue of Wire and Wire Products.

★ ★ ★

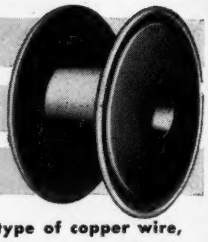
Birth Of Nickel

Recently displayed by International Nickel at the National Metals Exposition in Detroit was a scale model of the laboratory in which 200 years ago the Swedish scientist Cronstedt discovered the element nickel. Although the face of the model measured only 22″ by 7″, it contained hundreds of authenticated items of the time in miniature.

★ ★ ★

Apco...

SPOOLS
REELS
BOBBINS



. . . for every type of copper wire, steel wire and wire rope application.

Leader in the industry for more than 50 years, Apco Mossberg has manufactured almost every conceivable kind of steel spools, reels and bobbins. Contact us for free engineering service — we will be glad to offer suggestions and solutions to *your* particular problems. Write today for our illustrated booklet.

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Hugh P. Williams & Co.
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Toronto, Ont., Canada

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Top quality non-returnable spools . . available in standard head and barrel sizes.

Write for a quotation today!

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1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
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BELL-MINE

LIME

for

WIRE DRAWING

WARNER COMPANY

BELLEFONTE DIVISION

BELLEFONTE, PA.

Sales Office

Philadelphia—Pittsburgh—New York

New "Blue Jacket" Wire-Wound Resistors Designed to Meet Military Specifications

Newest addition to the extensive line of electronic components made by the **Sprague Electric Company** is a remarkably humidity-resistant vitreous-enamel wire-wound resistor.

★ ★ ★

Known as the "Blue Jacket," the new Sprague development will withstand the severe performance requirements for characteristic G and J units in Joint Army-Navy Specification JAN-R-26A. Initial production of these resistors is in the complete range of military styles RW29 to RW39.

★ ★ ★

The Sprague Electric Company has established completely new facilities at a new plant at Kingston, N. Y. for the manufacture of Blue Jacket Resistors for the military and industrial electronic fields.

★ ★ ★

Complete performance data is given in Engineering Bulletin No. 110, available on letterhead request to the Sprague Electric Company.

SMALL WOOD SPOOLS

for

WIRE

Range of Sizes:

1" long with ¾" head diam.
up to
3½" long with 2⅛" head diam.

Supplied stained in any color according to your needs. Special finishes to order.

"NOWASCO" WOOD SPOOLS are used by many wire manufacturers for wire prepared for retail sale.

Write for samples and prices.

NORTH WATERFORD SPOOL CO.

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North Waterford, Maine
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1918—1952

METAL BOUND RETURNABLE REELS

Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

Write for details

WILLIAM McCASKIE, INC.

FORGE ROAD • WESTPORT • MASS.
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YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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new and exclusive process. This process is more efficient and recovers higher percentages of greater purity of used diamond powders.

Diamonds from worn grinding wheels, grinding wheel sludge and dust, cotton charged with powder used in die polishing, die washings and diamond bearing scrap — all

RECLAIMED SUCCESSFULLY

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Rolls REELY roll on
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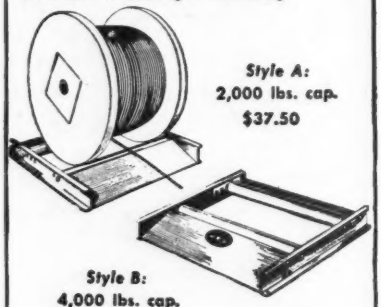
Go modern . . . save time . . . save labor . . . save cost.

ROLL-A-REEL

enables you to reel or unreel wire, cable, rope . . . easily, quickly . . . economically.

Adjustable slots for wide variety of reel sizes. Strong . . . with low slanted front and positive front lock for loading or unloading.



Style A:
2,000 lbs. cap.
$37.50

Style B:
4,000 lbs. cap.
$75.00

• PROMPT DELIVERY: ORDER NOW!

ROLL-A-REEL
327 West Fourth St. Cincinnati 2, Ohio

Wire as a Material for Product Fabrication

(*Continued from page* 365)

a 4-slide machine. Or, sometimes it is required that one eye be formed on the automatic and then the other eye be applied with hand forming or press forming. (See Fig. 8.)

★ ★ ★

The easiest eye to make is the "pear-shaped" or "tear-drop" shape. Drawings here illustrate this type of eye. In this situation the center line of the wire does not coincide with the center of the eye.

★ ★ ★

Sometimes it is very essential that the eye be "centered"—that is, the center line of the wire must coincide with the center of the eye. This can be accomplished with special operations.

★ ★ ★

Finally, it is possible to make eyes on wire formings that are fully closed or entirely round. As compared to the "tear-drop" formation, this fully round or completely formed eye is oftentimes more expensive to accomplish than the "tear-drop" shape.

★ ★ ★

EARS: It is required sometimes that ears be applied to the sides of a wire form. Ears might be needed where wooden wheels or washers must be limited in position on the wire, or kept from sliding.

★ ★ ★

These ears are easily applied by press tools—sometimes on one side and sometimes on both, as shown by illustrations.

★ ★ ★

(A) **In order** to produce a wide variety of wire products and parts, our production has been divided into several departments, each of which performs a definite operation as follows:

Straightening and cutting
Wire flattening
Wire forming—4 slide automatic machinery
Special hand forming and semi-automatic forming
Staple making for all sizes and types of wire staples
Power press—for blending, blanking and stamping
Electric welding—butt welding, single and multiple spot welding

WIRE

FERROUS and NON-FERROUS

COPPER • BRASS • LOW BRASS
PHOSPHOR BRONZE • NICKEL
SILVER • PURE NICKEL • MONEL •
STEEL TINNED • BRUSH (all metals)
and "twisted" wires.
Specialists in BRUSH WIRE and wires for weaving.

All types of Ferrous and Non-Ferrous wires for filters, screens, brushes, weaving, etc., down to the smallest diameters—*in all metals.*

Write, wire or telephone to

GROMA TRADING CORP.
50 BROAD ST., NEW YORK 4, N.Y.
Tel.: Bowling Green 9-0420
Agents for
J. G. DAHMEN & CO.
Hagener Landstrasse 73
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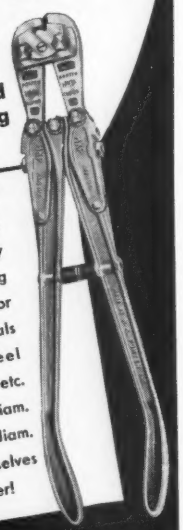
WIRE MANUFACTURERS

PORTER CARBIDE-EDGED CUTTERS

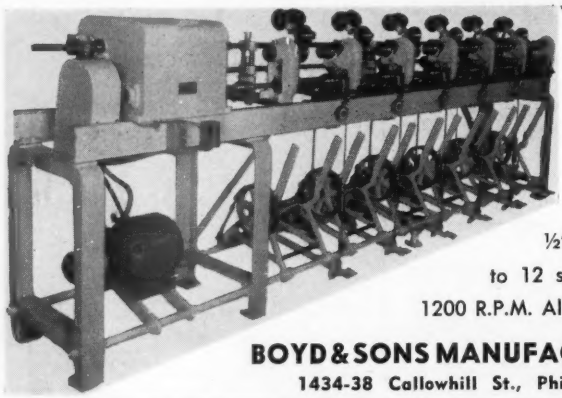
for extremely hard materials, including stainless steel.



Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc. #3 cuts to 5/16" diam. #4 cuts to 3/8" diam. Pay for themselves many times over!

ORDER THROUGH YOUR INDUSTRIAL SUPPLY HOUSE

H. K. PORTER, INC., Somerville 43, Mass.
Manufacturers of PORTER CUTTERS, PORTER PRUNERS and PORTER-FERGUSON Auto Body Fender Repair Tools



BOYD'S NEW MULTI-HEAD SPOOLER

Winds wire on spools up to 10" in diam. Traverse of ½" to 8". Made with 1 to 12 spindles. Speeds up to 1200 R.P.M. All parts precision made.

BOYD & SONS MANUFACTURING CORP.
1434-38 Callowhill St., Philadelphia 30, Pa.

BALLOFFET-VIANNEY
Diamond Dies

Skill and accuracy in manufacture with the use of selected stones make Balloffet-Vianney Diamond Dies the choice of the most critical users.

MEMBER

Manufacturers of
Quality diamond dies since 1870

Plating—for electroplating, lacquering and enameling

★ ★ ★

(B) **Other** departments concerned with what is made are the Engineering Department, where designs are made and samples produced; the Machine and Tool Room, where special tools and dies are constructed for special jobs; the Stock Room, where coiled wire and strip is stored for use in fabricating processes; the Inspection Department, which checks products against specifications throughout the run; the Finish Department, where special finishes are applied to formed products; and last but not least, the Shipping Department, from which products emerge to be started on their way to the ultimate consumer—one of the most important at the present time being Uncle Sam.

★ ★ ★

YOU ARE CORDIALLY INVITED TO JOIN THE WIRE ASSOCIATION and participate in its activities. In becoming a member, you help yourself and others to advance the interests of our great industry.

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.000's to .102"
For many years . . .
Outstanding in quality,
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DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL AJAX SUPPLIES INC.
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Coating Metal Used in Hot-Dip Galvanizing

(*Continued from page* 360)

being highly contaminated with iron.

Reclaimed Zinc:

Reclaimed zinc if done with the right equipment and under strict controls, can be very good metal to charge in small amounts back into the pot. Because it does not contain lead, and is so pure, it can only be used in small amounts along with the usual slab zinc used that does supply the lead to the pot. Of course knowing why such metal cannot be used, it is always possible to purchase enough pig lead, and add it to the pot to bring up the quality of the bath to that obtained when zinc with the lead in it is used.

Pan Zinc:

This is a type of zinc that years ago was obtained by taking a steel pan about three feet wide and four feet long, and setting it in a slanting position over a fire of the old Dutch Oven Type. At the end of each week the skimmings from the open side of the bath were placed in this slanted pan and worked over with a rake as sal amonniac was spread over the oxide skimmings. Hydrogen and ammonia gas were formed and when lighted by throwing a match into the pan, generated enough heat to melt the metallics in the oxide skimmings. The metal ran down the pan to a puddle in the front where it was tapped out through a small pipe welded into one corner of the pan. The skill required in this treatment however led to its final elimination as a method of reclaiming metal. The gases when burning often created so much heat that the powdered zinc oxide itself caught fire, and this ruined the quality of the metal recovered because it was so badly overheated.

Scrap Zinc:

At times the question of scrap zinc comes up as a metal that can be used in galvanizing pots. Stencils, mason jar lids, and some zincs can be used in small amounts, but before using any scrap zinc a very complete analysis of the metal

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should be available. Scrap zincs containing antimony and other impurities cannot be used. There is always the question too of getting small pieces of scrap zinc into the molten condition. The waste in melting, time, and labor required often makes this kind of metal more expensive than to purchase good high grade slab zinc.

★ ★ ★

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2. **International Conference on Hot-Dip Galvanizing, held in Copenhagen, Denmark, July 17-21, 1950. Paper "Can Dross Be Eliminated in Hot-Dip Galvanizing?" by Wallace G. Imhoff.**

★ ★ ★

Production Non-Ferrous Wire Annealing at Bridgeport Brass

(*Continued from page* 371)

The furnace heating chamber has an internal width of 6 feet 8 inches and an internal length of 13 feet. The door opens to a height of 24 inches. To meet the height limitations of the building, the furnace was constructed with an overall height of approximately 10 feet 6 inches, the overall width being 9 feet 4 inches, and overall length 22 feet 4 inches. The furnace is fully insulated on the side walls with insulating firebrick and block insulation. The arch is made of insulating firebrick. The bottom is composed of insulating firebrick plus considerable thickness of block insulation.

★ ★ ★

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★ ★ ★

The materials handling features of this furnace were particularly designed for the low overhead space requirements of the Bridgeport Brass Company's Wire and Rod Mill. However, the overall economy of space and fuel which it provides together with its uniform heating characteristics should make this type of annealing furnace of interest to any batch-operated Wire or Rod Mill.

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National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER COMPOUNDS—Pre-Mixed
Ace Abrasive Laboratories, New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
National Research Co., St. Claire Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Carboloy Dept. of General Electric Co., Detroit Mich.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide
(See Dies—Tungsten Carbide)

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio.
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N.Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Allied Products Division, New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIES—Swaging
Murex, Ltd., Rainham, England
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tantalum Carbide
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

WHERE TO BUY, Continued

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIES—Tungsten Carbide
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Hubbard Spool Company, Garrett, Indiana
Niles Steel Products Division, Republic Steel Corporation, Niles, Ohio

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., The, Paterson, N. J.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Copper—Leonard D. Walde, North Plainfield, N. J.
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Mill—Lewis, Kenneth B., Worcester, Mass.
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EQUIPMENT—Insulation Testing
Davis Elec. Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Company, The, Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Electric
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Trauwood Engineering Co., The, Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Surface Combustion Corp., Toledo, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
Trauwood Engineering Co., The, Cleveland, Ohio.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Buffalo, N. Y.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT—
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Bronze Die Casting Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

IMPREGNATING MATERIALS—
Standard-Toch Chemicals, Inc., New York, N. Y.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Company, The, Pittsburgh, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
American Insulating Machine Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Owens Corning Fiberglas Corp., Toledo, O.
Solar Compounds Corporation, Linden, N. J.
Standard-Toch Chemicals, Inc., New York, N. Y.

INSULATING MATERIALS—Paper—For Electric Wire Cable.
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Standard-Toch Chemicals, Inc., New York, N. Y.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LATHES—Die Reaming
Carboloy Dept. of General Electric Co., Detroit, Mich.
Roos, Tool & Mfg. Div., Dykrex Corp., Newark, N. J.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Heil Process Equipment Corp., Cleveland, Ohio

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Haas Miller Corp., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Kayser, J. G. Machinenfabrik, Nurnberg, Germany
Wafios, Maschinenfabrik, Reutlingen, Germany
Wean Engineering Co., Cleveland, Ohio.

MACHINERY—Bead Wrapping
Terkelsen Machine Co., Boston, Mass.

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Brazing
Eisler Engineering Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans
(See Machinery—Wind-Up)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Radderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Coilers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
Morgan Construction Co., Worcester, Mass.
National Machy. Exch. (used) New York, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Euipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Cold Heading
(See Cold Headers)

MACHINERY—Copper Wire Drawing and Rolling
Aetna-Standard Engineering Co., Youngstown, Ohio
American Insulating Mach'y Co., Phila., Pa.
Fenn Manufacturing Co., The, Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Medart Company, The, St. Louis, Mo.
Mettler Machine Tool, Inc., New Haven, Conn.
National Mach'y Exch. (Used) New York, N. Y.
Porter, H. K., Inc., Somerville, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Die Making
Carboloy Dept. General Electric Co., Detroit, Mich.
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Roos Tool & Mfg. Div., Dykrex Corp., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Dielectric Spark Testers
(See Machinery—Spark Testing)

MACHINERY—Draw Benches
Aetna-Standard Engineering Co., Youngstown, Ohio
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilio, Milano, Italy
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Edging
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Electrode Units
(See Machinery—Spark Testing)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wafios, Maschinenfabrik, Reutlinger, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., The, Hartford, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Stanat Manufacturing Co., Long Island City, N. Y.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Kayser, J. G., Maschinenfabrik, Nurnberg, Germany
Nilson, A. H., Machine Co., Bridgeport, Conn

MACHINERY—Galvanizing
(See Galvanizing Equipment)

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Wartenweiler, Emilio, Milano, Italy

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Material Handling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Kayser, J. G., Maschinenfabrik, Nurnberg, Germany
Meyer, Roth & Pastor Maschinenfabrik, Koln-Radderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlinger, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Radderberg, Germany

MACHINERY—Pointing
Aetna-Standard Engineering Co., Youngstown, Ohio
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
American Insulating Mach'y Co., Phila., Pa.
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Mach'y Exch. (Used), New York, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Stanat Manufacturing Co., Long Island City, N. Y.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Machy. Exch. (used) New York, N. Y.
Stanat Manufacturing Co., Long Island City, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Screw Making
Kayser, J. G., Maschinenfabrik, Nurnberg, Germany

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Stanat Manufacturing Co., Long Island City, N. Y.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
Lundahl Corp., Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlinger, Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Kayser, J. G., Maschinenfabrik, Nurnberg, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlinger, Germany

MACHINERY—Straightening & Cutting
Fenn Manufacturing Co., The, Hartford, Conn.
Kayser, J. G., Maschinenfabrik, Nurnberg, Germany
Lewis Machine Co., The, Cleveland, Ohio
Medart Company, The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Radderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Nors-Holm Machine Div. of Nors-Holm Industries, Inc., Rochester, Michigan
Sleeper & Hartley, Inc., Worcester, Mass.
Wartenweiler, Emilio, Milano, Italy
Wean Equipment Corp., Cleveland, Ohio
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Aetna-Standard Engineering Co., Youngstown, Ohio
Steel Equipment Co., Cleveland, Ohio
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Swaging
Fenn Manufacturing Co., The, Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

WHERE TO BUY, Continued

MACHINERY—Take-Up and Pay-Out Systems
Aetna-Standard Engineering Co., Youngstown, Ohio
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Standard Machinery Co., Mystic, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Testing, Physical
Lundahl Corporation, Hartford, Conn.
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Marshall-Richards Machine Company, Inc., Trenton, N. J.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply, Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Winding Wire
Federal Manufacturing Co., Wallingford, Conn.
Standard Mill Supply, Pawtucket, R. I.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio.

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Youngstown, Ohio
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Fenn Manufacturing Co., The, Hartford, Conn.
Kurt Orban Co., Inc., New York, N. Y.
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn
Kilmer, M. D. & Co., Cleveland, Ohio.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlinger, Germany

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N. Y.

MACHINERY—Wrapping Straight Lengths and Tubing
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

MACHINERY—Wrapping Wire Coils
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Stanat Manufacturing Co., Long Island City, N. Y.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio.

NAILS—Wire
American Steel & Wire Co., Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
Wickwire Brothers, Inc, Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Dehydrogenizing
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio.
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio.
Standard-Toch Chemicals, Inc., New York, N. Y.

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Standard-Toch Chemicals, Inc., New York, N. Y.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See Wind up and Unwind Systems)

PHOSPHATE COATING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Bronze Die Casting Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio.

PIPES & FITTINGS—Acid Resistant
Heil Process Equipment Corp., Cleveland, Ohio.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

PNEUMATIC CYLINDERS—
Entwistle, Jas. L. Co., Providence, R. I.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio.

PRESSES—Hydraulic and Mechanical
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Roll-A-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio.
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Drawn Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Indiana

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

REELS & SPOOLS—Collapsible
Entwistle, Jas. L. Co., Providence, R. I.

REELS & SPOOLS—Plastic
Hubbard Spool Co., Garrett, Indiana

REELS & SPOOLS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
Mason Can Company, East Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
North Anson Reel Co., No. Anson, Me.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
North Anson Reel Co., No. Anson, Me.
No. Waterford Spool Co., No. Waterford, Me.

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Pay-off
Nors-Holm Industries, Rochester, Mich.

REELS—Takeoff
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio
North Anson Reel Co., No. Anson, Me.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio

REELS—Wire Drawing
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Indiana
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio

WHERE TO BUY, Continued

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Garrett, Indiana
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.
North Anson Reel Co., No. Anson, Me.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

RESISTANCE HEATING—Annealing Patenting, Etc.
Trauwood Engr. Co., Cleveland, Ohio.

ROD BAKERS—
(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio.
U. S. Steel Co., N. Y., N. Y.

RODS—Wire—Non-Ferrous
American Brass Co., The, Waterbury, Conn.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Erie Iron & Supply Corp., Erie, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Montan Export, Inc., New York, N. Y.
Pittsburgh Steel Company, Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Art Wire and Stamping Co, Newark, N. J.
Hubbard Spool Company, Garrett, Indiana
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio

TANKS—Steel
Chemsteel Construction Co., Pittsburgh, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Cords, Decorative
(See: Tinsel—Electric Conductor)

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL—Electric Resistance
(See: Tinsel—Electric Conductor)

TINSEL—Lame, Silver and False Gold
(See: Tinsel—Electric Conductor)

TINSEL—Thread, Silver and False Gold
(See: Tinsel—Electric Conductor)

TINSEL—Thread, Decorative
(See: Tinsel—Electric Conductor)

TINSEL—Wire
(See: Tinsel—Electric Conductor)

TOOLS—Spring Forming
Lundahl Corporation, Hartford, Conn.

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

TUBE BENDERS AND FORMERS—
H. D. Kilmer Co., Cleveland, Ohio.

TURKS HEADS—
Fenn Manufacturing Co., The, Hartford, Conn.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.
Standard-Toch Chemicals, Inc., New York, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

WIRE—Alloy
Montan Export, Inc., New York, N. Y.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, Ohio

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brush
Groma Trading Corp., New York, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Coppered
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Electric
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., Cleveland, Ohio

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Groma Trading Corp., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Art Wire and Stamping Co, Newark, N. J.

WIRE—Galvanized
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Montan Export, Inc., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Montan Export, Inc., New York, N. Y.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Nickel Silver and Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Groma Trading Corp., New York, N. Y.
Malin & Co., Cleveland, Ohio.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Non-Ferrous to Specifications for Special Purposes
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Cleveland, Ohio
Chase Brass & Copper Co., Waterbury, Conn.
Groma Trading Corp., New York, N. Y.
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
American Brass Co., The, Waterbury, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Company, The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling Steel & Carbide Corp., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Art Wire and Stamping Co., Newark, N. J.
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Weaving (Non-Ferrous)
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Groma Trading Corp., New York, N. Y.

WRAPPING PAPER—Creped
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.

YARNS & TAPES—
Glass Fibers, Inc., Toledo, Ohio
Owens Corning Fiberglas Corp., Toledo, Ohio.

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

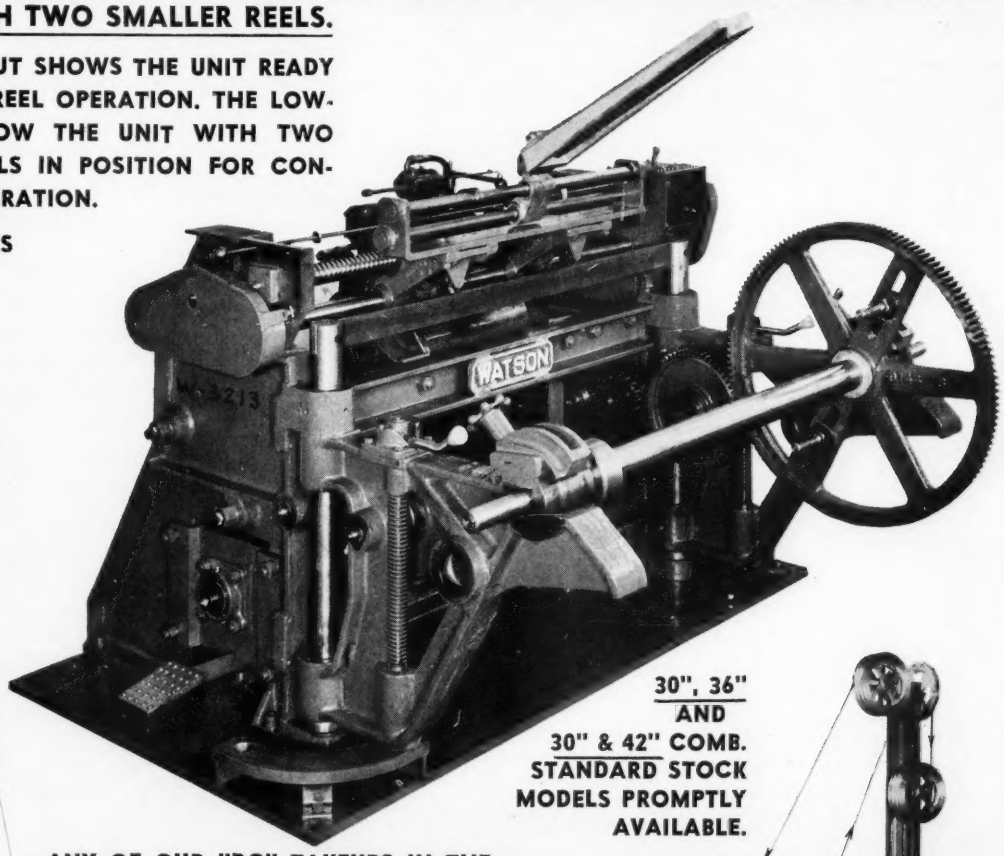
WATSON

TAKEUPS TYPE "DC"

THIS DOUBLE PURPOSE "COMBINATION" MODEL OPERATES WITH SINGLE LARGE REELS AND QUICKLY CONVERTS TO A CONTINUOUS TAKEUP OPERATING WITH TWO SMALLER REELS.

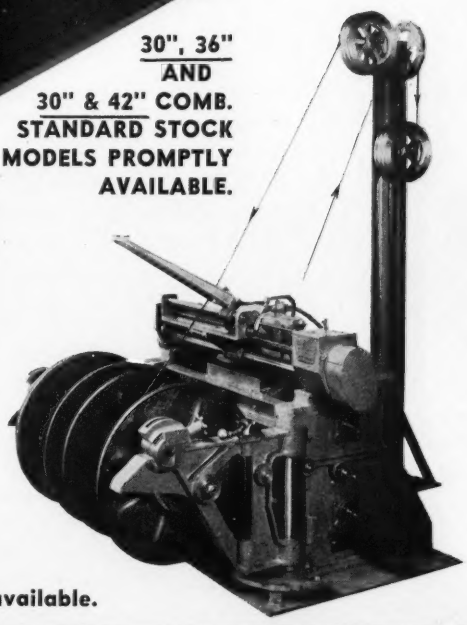
THE UPPER CUT SHOWS THE UNIT READY FOR SINGLE REEL OPERATION. THE LOWER CUTS SHOW THE UNIT WITH TWO SMALLER REELS IN POSITION FOR CONTINUOUS OPERATION.

IN BOTH CASES THE TAKEUP FUNCTIONS WITHOUT FRICTION-SLIP, AND THE WINDING TENSION REMAINS UNIFORM DURING THE REEL-RUN BUILD-UP.

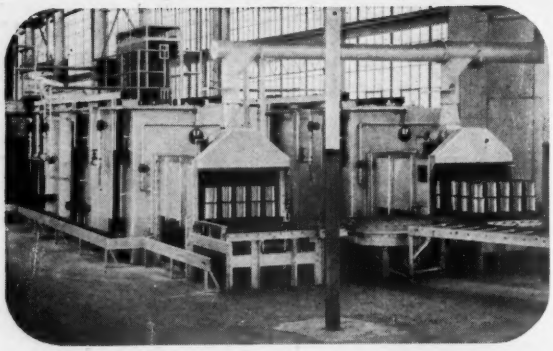


30", 36" AND 30" & 42" COMB. STANDARD STOCK MODELS PROMPTLY AVAILABLE.

ANY OF OUR "DC" TAKEUPS IN THE FIELD CAN EASILY BE CONVERTED TO "COMBINATION" MODELS BY SUPPLY OF ADDITIONAL PARTS, WITHOUT DISTURBING THE TAKEUP LOCATION.



Machine bulletin 010552 available.



Bright annealing wire. EF gas-fired and electric furnaces are built in many sizes and types for bright annealing wire on spools or reels, in coils or strands—ferrous and non-ferrous, including stainless.

Clean annealing nickel-silver and other alloy wire in an EF gas fired radiant tube continuous roller hearth furnace. Handles coils up to 30" in diameter.

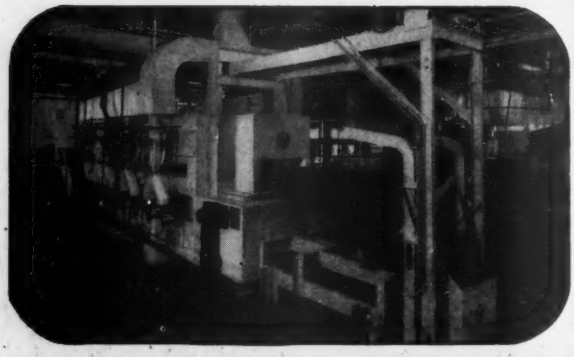
EF builds Gas-Fired, Oil-Fired and Electric Furnaces for these and other heat treating operations

● EF engineers specialize in designing and building production furnaces — continuous and batch types — including roller hearth, roller rail, chain belt, wire belt, slot and tube conveyor types, reciprocating, rotary, car, bell, pit and other designs; complete with special atmosphere producers, and time and labor saving material handling equipment as required.

Reflecting more than 30 years of continuous research and experience, and outstanding engineering accomplishments, EF furnaces combine high heating efficiency, accurate automatically controlled cycles, and advanced designs that minimize maintenance, assure economy of operation, high hourly output and uniformity of product.

Submit your production furnace problems to ***experienced engineers — it pays.***

- AGING
- ANNEALING
- ALUMINIZING
- BRAZING
- CARBON RESTORATION
- CARBURIZING
- CERAMIC DECORATING
- DRAWING
- GALVANIZING
- HARDENING
- HOMOGENIZING
- MALLEABLIZING
- NORMALIZING
- NITRIDING
- SINTERING
- SOLUTION TREATING
- SPECIAL ATMOSPHERE TREATMENTS AND OTHER PROCESSES



EF CHAIN BELT CONVEYOR FURNACES. Unsurpassed for uniform, low cost scale-free hardening, carbon restoration and non-decarb heat treating small and medium size products—continuously. 11 sizes. Capacities 175 to 2000 lbs. per hour. 12 page bulletin available.

The Electric Furnace Co.

Salem, Ohio

Gas-Fired, Oil-Fired and Electric Furnaces For any Process, Product or Production